AMBIDEXTROUS BEHAVIOUR IN NEW BUSINESS DEVELOPMENT PROJECTS: UNDERSTANDING THE ROLE OF FORMAL AND INFORMAL CONTROL MECHANISMS

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Abstract

In recent years, more and more organisations have successfully relied on ambidextrous behaviour to gain a competitive advantage. Ambidextrous organisations simultaneously encourage exploration of new resources through innovation and creativity and exploitation of current resources by coordinating resources with organisational strategies.

A recent stream of research has recognised the helpful role control systems play in making firms more ambidextrous. Most empirical studies in the area of control systems used to create ambidextrous organisations have been at the corporate or business-unit level. The literature has paid little attention to the use of control mechanisms in creating ambidexterity at the new business development project level, even though they play a central role in today's managerial exercises.

Taken in this light, the control literature suggests that further research should examine the role of control systems and their mechanisms in shaping ambidextrous behaviour in businesses at the project level. The current study aims to fill this gap in existing strategy and control literature by examining the effect of control mechanisms on ambidexterity at the new business development project level.

The findings suggest that a complementary relationship between formal and informal control mechanisms is necessary to successfully develop ambidextrous behaviour, rather than using the substitutional method. As such, this thesis provides important insights into the utilisation of control mechanisms in relation to the development of ambidextrous behaviour in new business development projects. The findings provide managerial guidance regarding how to carefully combine budget with interactive control and project manager experience to promote ambidexterity, and how such a unique combination can function through centralised decision-making and interactive control, assisting project members to dynamically interact using centralised forms of decision-making to develop ambidextrous behaviour.

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List of Abbreviations

NBD	New Business Development
R&D	Research and Development
VIF	Variance Inflation Factors

Statement of Original Authorship

The work contained in this thesis has not been previously submitted to meet requirements for an award at this or any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

Signature: QUT Verified Signature

Date: March 2017

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Writing a thesis, especially an academic thesis, is like growing an oak tree. What kind of acorn will you choose? What soil and fertilizer will you supply? Will you be able to consistently care for the oak seedling until its roots deepen? It is a long-term project and requires a "strategy". I wanted to write the best possible thesis, that would be beneficial to everyone, especially the business and management community. Before undertaking my academic study, I ran small businesses in different industries. As an entrepreneur, I realised that the real "mechanism" of organisational behaviours and interactions was quite different from what I had read in prestigious academic publications. Driven by dozens of perplexities and based on a huge amount of reading, research, and practical investigation, I began the exploration of my research topic and wrote this thesis.

I wish to acknowledge my sincere thanks and appreciation for my supervisor, Dr. Henri Burgers, who has been a wonderful role model throughout my research program studies. Henri has always inspired and taught me at an extremely high academic standard. I do not remember how many times he revised my thesis and analysed the data, providing me with generous feedback and comments. A big thumbs up for all his good-natured patience! Henri is my teacher, my mentor, and my big brother. I also wish to express my thanks to Dr. Kavoos Mohannak, who fairly and truly helped me complete this thesis. His generous offer was a tremendous tonic for my morale.

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Last but not least, I want to mention that although writing a thesis may be the most difficult task of your academic life, whatever you choose to study, enjoy. Be interested, be enthusiastic, it is very rewarding. Don't forget, one day, the small tiny acorn will become a mighty soaring oak tree; strong, and beautiful.

Chapter 1: Introduction

1.1 INTRODUCTION

In today's highly competitive and dynamic business environment, an organisation needs to accomplish two conflicting activities to survive. The organisation needs to constantly optimise its internal operation through exploitation, while being capable of discovering and exploring new opportunities in the market (Gibson & Birkinshaw, 2004; O´Reilly & Tushman, 1996, 2011). The ambidextrous organisation is capable of managing two contradictory functions: exploitative and explorative (Lubatkin, Simsek, Ling, & Veiga, 2006). There is tension between these two functions due to their incompatible features (Andriopoulos & Lewis, 2009; Raisch, Birkinshaw, Probst, & Tushman, 2009). Such tension can be properly resolved through suitable utilisation of a control system and its mechanisms, which will assist the organisation to move toward ambidexterity (Bedford & Malmi, 2015; Tiwana, 2010).

In this respect, the organisation needs to utilise different control mechanisms to conduct ambidextrous behaviour, which requires management of the exploitative and the explorative functions. However, selecting suitable control mechanisms is challenging, due to the contradictory features and characteristics existing within the exploitative and explorative functions. The exploitative function is usually accomplished by using a formal control mechanism (e.g., project efficiency and cost-reduction), while the explorative function is usually achieved by using an informal control mechanism (e.g., project innovation and discovery) (Cardinal et al., 2004; Jansen, Van Den Bosch, & Volberda, 2006; Mundy, 2010; Tiwana, 2010; Ylinen & Gullkvist, 2013).

Thus, understanding how organisations manage their formal and informal control mechanisms in order to achieve the ambidextrous behaviour has emerged as an important research question (Sivabalan & Bisbe, 2015; van der Meer-Kooistra & Scapens, 2015). Such an understanding demands an investigation into the control system and its interactive mechanisms in the development of ambidextrous behaviour (Bedford & Malmi, 2015; Bisbe & Otley, 2004; Mundy, 2010; Sandino, 2007; Kruis, Speklé, & Widener, 2014).

Overall, both exploitative and explorative functions need to be managed through the coexistence of formal and informal mechanisms within the control system in order to achieve ambidextrous behaviour. However, most studies examining how control systems are applied in ambidextrous organisations have primarily focussed on the corporate or business-unit level (Bisbe & Otley, 2004; Collier, 2005; Henri, 2006; Mundy, 2010; Tuomela, 2005; Widener, 2007). Studies have paid little attention to the literature regarding the control system and its interactive mechanisms at the level of new business development (NBD) projects (Bedford & Malmi, 2015; Sivabalan & Bisbe, 2015). As a result, this conceptual domain has not been well defined in prior project literature (Chiesa, Frattini, Lamberti, & Noci, 2010; Jorgensen & Messener, 2009). Little is known about what type of control mechanism would allow a business to gain ambidexterity at NBD project levels (Tiwana, 2010). Most importantly, it is explicitly clear how interactions of formal and informal control mechanisms can benefit a company in developing ambidextrous behaviour. Disagreement exists about whether the use of one form of control mechanism reinforces or diminishes the benefits of another control mechanism in the formation of ambidexterity (Mundy, 2010; Tiwana, 2010). In other words, do formal and informal control mechanisms complement or substitute for each other in the development of the ambidextrous project? There is very little research in this area at the project level (Sivabalan & Bisbe, 2015; Tiwana, 2010). The essential reasoning for studying NBD projects is that in practice such projects are managed and seen with regards to more explorative purposes, but in reality consist of both explorative and exploitation activities (Burgers et al., 2008). This lack of ability to manage and facilitate ambidextrous behaviours in NBD projects is a major cause of NBD failure (Hill & Birkinshaw, 2014). The development of supportive organisational mechanisms that nurture ambidextrous behaviour in new business development is a major gap in the literature (Burgers et al., 2008; Hill & Birkinshaw, 2014). The primary method for stimulating ambidextrous behaviour at the organisational level is the combination of informal and formal control mechanisms (cf. Burgers et al, 2009; Jansen et al., 2009). This thesis argues that it is therefore important to investigate how these concepts apply to stimulating ambidextrous behaviour in NBD projects.

1.2 OBJECTIVE OF STUDY

The current empirical study seeks to combine two different areas in business knowledge through the existing communality of strategy and control literature. The objective of the study is the examination of control systems and their functions in building ambidextrous behaviour at the project level. The study examines how interactions of the formal and informal control mechanisms within control systems can synergistically create ambidextrous behaviour in NBD projects. This examination could improve understanding of the interactions between control mechanisms that facilitate a capability for the project members to manage both exploitative and explorative functions in order to become ambidextrous. The overall objective of this study is to increase understanding of how organisations can successfully create ambidextrous new business development projects through the use of informal and formal control mechanisms.

1.3 RESEARCH QUESTIONS

The current study aims to explain the effects of formal and informal control mechanisms upon the development of ambidextrous behaviour in new business development projects. As ambidextrous behaviour is a complex phenomenon, understanding control systems and interactions of mechanisms can provide a more comprehensive perspective.

The following research questions address the study's objective:

1. What are the relevant formal and informal control mechanisms required to develop ambidextrous behaviour in new business development projects?
2. Which type of ambidextrous behaviour is most relevant in the context of new business development projects?
3. What are the interaction effects of formal and informal control mechanisms on ambidextrous behaviour in new business development projects?

The literature review addresses the first and second questions in this thesis using theoretical evaluation; while the third question is answered empirically through the use of the statistical method.

1.4 CONTRIBUTIONS

This study contributes to the literature in two ways. Firstly, the current study draws on prior research in strategic and control literature by investigating formal and informal mechanisms in relation to organisational ambidexterity. A series of studies have examined different organisational mechanisms and ambidexterity; for example, organisational antecedents (Jansen, Volberda, & Van Den Bosch, 2005, 2006), integration mechanisms (Jansen, Tempelaar, Van den Bosch, & Volberda 2009), formal and coordination mechanisms (Mom, Van Den Bosch, & Volberda, 2009) and formal/informal control mechanisms (Bedford, 2015; Tiwana, 2010; Ylinen & Gullkvist, 2013). This thesis extends the prior studies that have already considered the combination of organisational mechanisms and their effects on ambidexterity by adding a new combination of formal and informal control mechanisms. This study contributes to the literature by expanding how centralised decision-making and budgeting as formal control mechanisms can benefit the implementation of ambidextrous behaviour by combining with informal control mechanisms, such as interactive control and project manager experience.

Secondly, although it is noted that there are interactions affecting the guidance of ambidexterity and its consequences on different levels (Raisch et al., 2009), research into organisational ambidexterity usually focuses on the following levels: individual and unit (Jansen et al., 2006; Mom et al., 2009), top management (Carmeli & Halevi, 2009; Lubatkin et al., 2006; Nemanich & Vera, 2009), or corporate (Cao Gedajlovic, & Zhang, , 2009; He & Wong 2004); it largely neglects the project level (Sivabalan & Bisbe, 2015). This study develops a more comprehensive approach to NBD. This is addressed by providing evidence of the role of control mechanisms in building ambidextrous behaviours at the project level. The main contribution of this study is therefore to explore the role of control mechanisms to manage the competing theoretical standpoints on whether formal and informal control mechanisms are complements to, or substitutions for each other in relation to ambidextrous behaviour at the project level.

1.5 RESEARCH METHODOLOGY

The purpose of this quantitative study is to explore the phenomena of the effects of formal and informal control mechanisms upon ambidextrous behaviour in

NBD projects. The current study employed a cross-sectional survey on NBD in the Dutch industry. Data collection was undertaken in collaboration with the Association of Business Development Netherlands, using their database of NBD projects. The survey was conducted on a sample of 1041 NBD projects. A total of 139 responses were obtained, with a response rate of 15.1 percent. Moderated regression analysis was used to analyse the data to investigate the moderation effects of informal control mechanisms on formal mechanisms in the development of an ambidexterity concept.

1.6 OUTLINE OF THE DISSERTATION

This section provides an overview of the study's structure and corresponding research activities.

Chapter 1 - Introduction: This chapter explains the research, outlining the rationality and objective of the research. The contributions to management knowledge, as well as its practical implications are also discussed.

Chapter 2 – Literature Review: This chapter begins with an investigation into the central topic of today's business market: ambidextrous behaviour. It explains how such a behaviour is shaped, how control systems can help the formation of ambidextrous behaviour, and describes the nature of ambidextrous behaviour in NBD projects. Overall, this chapter aims to synthesise the theoretical concepts of organisational ambidexterity and control systems in the literature, and explain the conceptual domain.

Chapter 3 – Hypothesis Development: This chapter develops the hypotheses in regards to the context of the study and explains the selected control mechanisms by introducing their features and attributes.

Chapter 4 - Research Methodology: This chapter explains the research philosophy and provides a justification for the research method and research design adopted in the proposed hypotheses. A description of the sampling strategy and the study's research approach is then provided. Moreover, the chapter explains the different statistical analytical tools used to determine the research outcomes to measure and validate the study's constructs.

Chapter 5 - Results:

This chapter provides the regression analysis of the collected data from the research hypotheses, and interprets the results.

Chapter 6 – Discussion: The final chapter explains the research conclusion by discussing the empirical findings in the setting of the research hypotheses and problem statements. The implications of the study and limitations for future research are then presented.

Chapter 2: Literature Review

2.1 EXPLOITATION & EXPLORATION

2.1.1 Conceptual Definition

Exploration and exploitation are the primary organisational activities required for short-term and long-term survival (March, 1991). Exploration and exploitation concepts have been commonly investigated in management literature through various areas, such as organisational learning (Gupta, Smith, & Shalley, 2006; Levinthal & March, 1993; March, 1991), strategic management (Auh & Menguc, 2008; Ebben & Johnson, 2005), organisational design and structures (Adler, Goldoftas, & Levine, 1999; Gibson & Birkinshaw, 2004; O'Reilly & Tushman, 2004), and leadership (Beckman, 2006; Lubatkin et al., 2006), which stress the substantial and imperative role of concepts in diverse subjects of managerial science.

In this sense, the literature has presented a diverse set of definitions in regards to the concepts of exploration and exploitation within different contexts. Therefore, for a better understanding of the principal meaning, this study demonstrates the original classifications concerning the context of the current thesis (Bisbe, Batista-Foguet, Chenhall, 2007). In this context, March (1991) and Benner & Tushman's (2003) conceptualisations are conducted, respectively, by illustrating the principal concepts' clarity, as well as pointing out the concepts' specification within new business development (NBD) projects as the context.

The exploitation concept includes such "things as refinement, choice, production, efficiency, selection, implementation [and] execution", whereas, exploration includes "things captured by terms such as search, variation, risk taking, experimentation, play, flexibility, discovery [and] innovation" (March, 1991, p. 71). March (1991) emphasised that "the basic problem confronting an organisation is to engage in sufficient exploitation to ensure its current viability, and at the same time, devote enough energy for exploration to ensure its future viability" (p. 105).

The current study applies the definitions of Benner and Tushman (2003) who built upon March (1991) and other scholars within the adaptation literature and defined the exploitation and exploration concepts as "Incremental technological

innovations and innovations designed to meet the needs of existing customers… and build upon existing organisational knowledge".

Exploration is defined as "Radical innovations or those for emergent customers or markets, they require new knowledge or departures from existing skills" (Benner & Tushman, 2003, p. 243).

The rationale for using the selected definitions is reflected in the conceptualisation of the exploitation and exploration concepts in the setting of radical and incremental innovation. As this study examines the project level of analysis, it is essential to build new knowledge through radical innovative functions, while at the same time using and leveraging existing knowledge through incremental innovative functions (Burgers, Van Den Bosch, & Volberda, 2008). Therefore, radical and incremental functions must exist in NBD projects. It is also important to capture features and interrelationships of radical and incremental functions through the lens of the exploitation and exploration concepts in NBD projects, as their nature largely depends upon knowledge development (Chiesa et al., 2010).

2.1.2 Exploration and Exploitation in NBD Projects

In recent years, the role of NBD projects has become more attractive to various organisations that aim to present innovative products and services within their own inflexible and formalised structures (Burgers et al., 2008). Successful companies must constantly develop new business opportunities through fresh products and services; doing so requires developing new technological and market knowledge through explorative functions, while at the same time applying current knowledge of their company through exploitative functions (Bauer & Leker, 2013). Therefore, many companies have operated NBD projects. Firstly, the key aspect of the project's structure is managing the knowledge of explorative and exploitative functions (Burgers et al., 2008). Secondly, most organisational structures and features primarily concentrate on refining and exploiting products and processes, it is therefore difficult to explore new business opportunities within those structures.

Taken in this light, at the project-level, explorative and exploitative functions are explicitly affected by project members, which include multi-actors with a diverse range of competences and specialties. The timing and extent of the integration process among project members and explorative and exploitative functions are

highly challenging and crucial. Furthermore, at the project level, the managing of both functions is affected by both formal (e.g., financing and authorities) and informal aspects (e.g., the degree of integration and cooperation of the project manager), which is also highly challenging (Ericsson, 2013; Liu & Leitner, 2012).

In this respect, previous research has mostly studied explorative and exploitative functions at the firm level (Jansen et al., 2009; O´Reilly & Tushman, 2011) or business unit level (Gibson & Birkinshaw, 2004; Jansen et al., 2006). Little attention has been paid to other organisational levels, such as the project level. Although a few studies have considered explorative and exploitative functions at the project level by distinguishing between projects to explore new knowledge and projects for continuous developments of existing knowledge, limited insight has been uncovered.

In this line of research, for example, Chiesa and colleagues (2010) found that radical innovation projects, particularly in the early stages of development, are mainly characterised by a strong support mechanism of informal and social control, while formal features mostly emerge in the late development and commercialisation stages. Furthermore, Sivabalan and Bisbe (2015) provided evidence demonstrating how the formulation of formal with informal mechanisms could have a significant role in innovation-oriented project work. Their findings show the interactive system (informal) seeks to identify and adapt new strategies, while the diagnostic system (formal) is willing to implement existing strategies in the project. The interaction of interactive and diagnostic systems can help a project tackle both exploitative and explorative functions. In addition, Andriopoulos and Lewis (2009) examined how the interplay and interaction of tight coupling (formal) and loose coupling (informal) mechanisms could significantly assist new product development to manage the tension between exploitative and explorative functions.

Although recent studies have contributed to this knowledge in some ways (Andriopoulos & Lewis, 2009; Chiesa et al., 2010; Sivabalan & Bisbe, 2015; Tiwana, 2008), there is still limited understanding as to how these functions can be managed in the project-base structure. In this respect, the current literature gap, which reflects the lack of project studies, is addressed in this thesis through investigation of how NBD projects can operate explorative and exploitative functions to build new knowledge and leverage existing knowledge.

2.2 AMBIDEXTERITY

2.2.1 Introduction of Ambidexterity

Ambidexterity is generally defined as a synergetic way of exploiting and exploring organisational resources that assist the firm in achieving superior performance. The synergetic method of exploiting and exploring functions requires accepting a tension between them, each function demanding different features, competencies, and resources (Jansen et al., 2005). In the context of NBD projects, for a project to become ambidextrous, the project is required to explore new knowledge related to new products and services for emerging markets, but also to apply to current competencies and exploit existing products and services (Danneels, 2002). Therefore, project members require diverse knowledge, skills, and abilities that promote both functions. In the setting of an NBD project, exploitative functions are generally recognised as incremental innovations and short-term performance, while explorative functions are seen as radical innovations and long-term achievements (Levinthal & March, 1993; March, 1991). The following section aims to explain the practical relevance concerning the significant role of ambidexterity and market place. In the 1980s, the Polaroid Company invested largely in the development of digital technology, which ultimately provided leading-edge technological competencies in digital imaging; appropriately, the top manager supported this investment for capturing larger market shares. At the time, the company was allocating most of its resources to the exploitation of technological knowledge that essentially enhanced the company's ability to achieve the development of digital imaging proficiencies. Although the company was successful in the exploitation of technological knowledge, the digital imaging project was not successful. The main reason was that the Polaroid Company did not recognize the significant need for exploration of new market knowledge, instead only focusing on exploitation of technological knowledge and current market knowledge. This reflects the company's need to simultaneously pursue both exploitation of current knowledge and exploration of new knowledge as a means to become ambidextrous. The company at that time had a very successful experience in instant photography; its business model was a so-called ''razor/blade'' strategy. This strategy involved the company suddenly dropping the price of cameras in order to motivate customer demands for film. The company then had a greater opportunity to sell film and this strategy earned a large amount of money. However,

in the case of digital imaging, where the customers do not use film, the situation would differ. Thus, requiring the exploration of new market knowledge to understand the market and competitors. The company had faced many new sets of competitors, including computer, electronics, and manufacturers companies. On this basis, as the Polaroid Company largely aligned its resources towards exploiting existing market knowledge, the company therefore progressively lost its strengths in the digital imaging and faced failure in capturing the market (Henri et al., 2008) In summary, if the Polaroid Company had simultaneously focused on both exploitation and exploration functions, which would have lead the company to act in ambidextrous manner, it would undoubtedly have become better positioned within the market, rather than only focusing on one function, such as exploitation. This therefore reflects why the Polaroid Company failed in its new strategy, as it did not act in an ambidextrous manner through the simultaneous utilization of exploitative and explorative functions.

The below section briefly reviews the concept of ambidexterity in the different conceptual definitions and selects the most appropriate definition based on the context and nature of the current study.

2.2.2 Ambidexterity Definition

Table 2.1 categorises the conceptual definition of organisational ambidexterity in management literature from different streams of research.

Table 2.1 Organisational Ambidexterity in the Literature

Stream of research	Conceptual definition
Organisational learning	"Organisational ambidexterity is the simultaneous pursuit of exploitation of existing competencies and exploration [of] new competencies" (March, 1991).
Technological innovation	"The ability to simultaneously pursue both incremental and discontinuous innovation and change" (Tushman & O'Reilly, 1996).
Organisational adaptation	"Organisational ambidexterity is being aligned and efficient in managing today's demands, while also being adaptable to changes in the environment" (He & Wong, 2004).
Strategic management	"Ambidexterity is the ability to both explore new possibilities in order to cope with future changes in the business environment and to exploit old certainties to meet today's business demands" (Mom et al., 2007).
Organisational design	"The firm ability to design dual structures (mechanistic vs. organic) that facilitated the initiating and implementation" (Duncan, 1976; Burn & Stalker, 1961).
Resource perspective	"Organisational ambidexterity is the dynamic capability of an organisation to simultaneously explore and exploit, accounting for its ability to adapt" (O'Reilly, Harreld, & Tushman, 2009).

The current study examines the behaviour of organisational ambidexterity, which can be shaped in NBD projects. More and more organisations are constantly developing NBD projects, as NBD projects rely heavily on the innovative manner. NBD projects provide the organisation with the capability to present new products and services. In this sense, Tushman and O'Reilly (1996) defined ambidexterity as "the ability to simultaneously pursue both incremental and radical innovation and change," which is compatible with the current study. As mentioned previously, NBD projects rely heavily on knowledge development to provide fresh products and services; therefore, both incremental and radical innovative functions are essential in building new knowledge and managing existing knowledge (Chiesa et al., 2010). The following section reviews the classification of organisational ambidexterity in the

literature and demonstrates how ambidexterity can be shaped through different approaches.

2.2.3 Organisational Ambidexterity Taxonomy

Researchers have proposed four possible approaches to organisational ambidexterity pursued between explorative and exploitative activities, which are systematically classified in the seminal article by Simsek, Heavey, Veiga, & Souder, (2009). The figure below indicates a typology of the formation of organisational ambidexterity, which was conceptualised by Simsek and colleagues (2009).

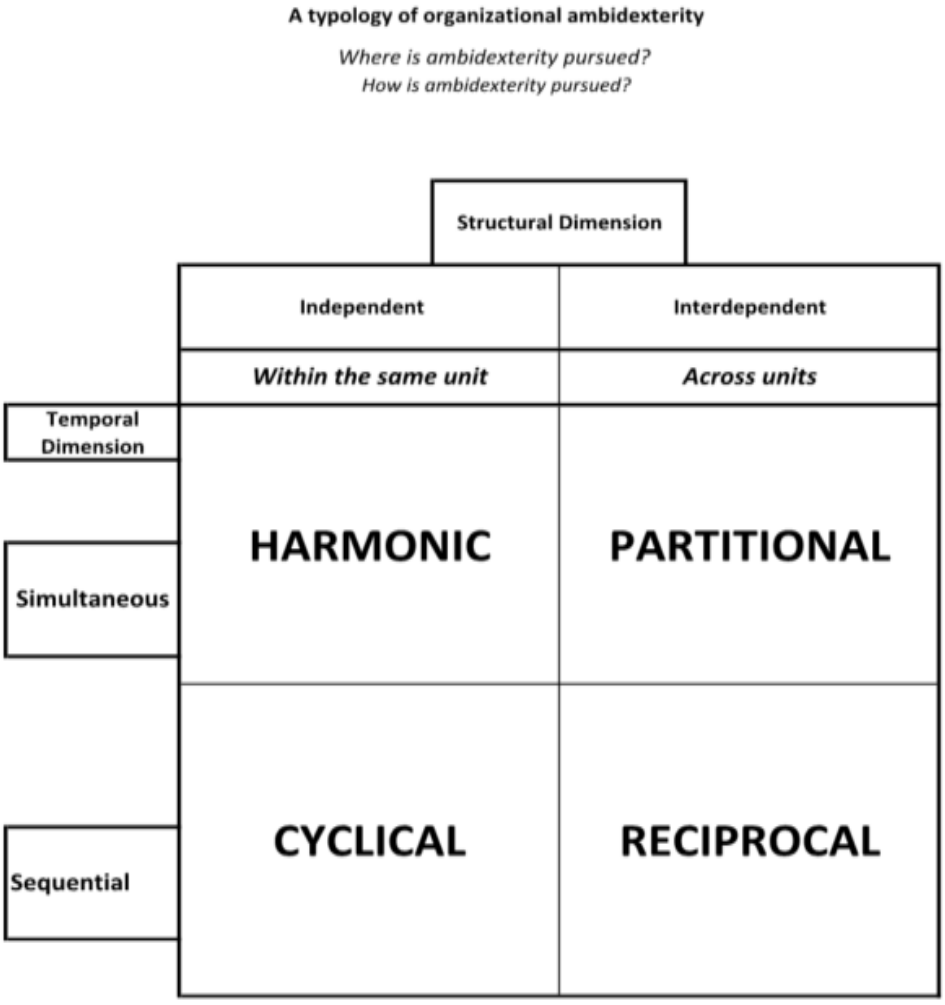

Figure 2.1 Typology of the formation of organisational ambidexterity

The literature on ambidexterity conceptualises explorative and exploitative functions as contradictory activities, and suggests separation-oriented approaches to achieve ambidexterity; namely, partitional, cyclical, and reciprocal separation (Simsek et al., 2009).

This study argues that viewing ambidexterity from the lens of the paradox allows examination beyond the separation-oriented method toward the synthesis of paradoxical poles (Papachroni, Heracleous, & Paroutis, 2015). To do so, the *harmonic* approach of ambidexterity is examined through the following explanations.

Firstly, within *partitional ambidexterity*, managers create separate business units within an organisation that specialise in one essential capability by exploiting or exploring resources, and the top management team has the responsibility to coordinate the business units to achieve ambidextrous behaviour at the organisational level. However, such a method might not proper in projects, because the project cannot be separated into the two divisions. The nature of the project is team work and the ongoing collaboration of project members (Chiesa et al., 2010).

Secondly, *cyclical ambidexterity* is defined as a whole unit that focuses on one set of functionality one day, then on a different set of functionality the next (Jansen, et al., 2009; Menguc & Auh, 2010; O'Reilly & Tushman, 2008). The *temporal* approach requires the competing demands of exploitative and exploration be met within a single business unit; however, it is still dependent on organisational architectures and managerial functions to determine how to meet these different needs (Boumgarden, Nickerson, & Zenger, 2012; Simsek et al., 2009). In this basis, cyclical separation is also quite challenging within a project where project members are required to allocate their time and resources between exploitative and explorative functions (Chiesa et al., 2010).

Thirdly, *reciprocal ambidexterity* is the result of explorative functions from unit A, which become the input for the explorative function by unit B, and again the outputs of the unit B transfer to become the inputs of unit A (Simsek et al., 2009). Such a method may not be possible in a project, as projects often produce only one result or outcome.

Structural-sequential mechanisms would primarily enhance exploitative and explorative functions by building and improving knowledge, but they are

problematic when placed in NBD projects. Consequently, a fundamental partitional-cyclical separation of explorative and exploitative functions in different organisational units does not by itself solve the issue of ambidexterity in NBD projects. Organisational researchers have paid more attention to partitional and cyclical methods by developing structural and temporal mechanisms to cope with the competing demands of ambidexterity (Jansen et al., 2009; Menguc & Auh, 2010; O'Reilly & Tushman, 2008). Simultaneously managing explorative and exploitative activities within a project can inherently cause more significant challenges. This is due to the absence of structural division, and this process can become more challenging over time, as both exploitation and exploration are intertwined with continuing operational and strategic processes. Thus, managerial concerns such as cultures, structures, systems, and members must be addressed in an integrative manner in order to bring out the best possible value within a project. As a result, the literature has introduced this form of ambidexterity in an organisational context and culture by presenting a *harmonic ambidexterity* (Simsek et al., 2009).

Based on this premise, this study examines contextual factors and their contributions to the formation of ambidextrous behaviour. It is essential to understand which contextual controllable factors can have a subsequent implication on ambidexterity and assist project managers to practice those factors for superior performance. This can be shifted to the manager for the correct utilisation of organisational mechanisms in new business projects to manage explorative and exploitative functions. Thus, the following section describes the nature and essence of harmonic ambidexterity.

2.2.4 Harmonic Ambidexterity

Gibson and Birkinshaw (2004) were the first scholars to highlight harmonic ambidexterity by demonstrating how actors are capable of "building a set of processes or systems that enable and encourage individuals to make their own judgments about how to divide their time between conflicting demands [for exploitation and exploration]" (p. 210). In addition, Adler and colleagues (1999) addressed this contextual and behavioural explanation through notions of "meta-routine, job enrichment, and task partitioning", in relation to how individuals manage their time between routine and non-routine tasks to be both efficient and flexible in the operation process. Prior literature has implicitly suggested several methods and

styles that promote the context of behavioural direction towards a collective ability for pursuing both explorative and exploitative activities; providing individuals with the ability to make integrative judgments regarding how to best allocate their time between the conflicting demands of exploitative and explorative functions (Gibson and Birkinshaw, 2004, p. 209-211).

In this line, Adler and colleagues (1999) explained how individuals within a unit independently applied different mechanisms to manage explorative and exploitative functions. For example, with job enrichment, employees are provided with learning and training experience to become familiar with exploration features; on the other hand, meta-routines provide coordination within the unit for individuals to manage exploitative activities (Adler et al., 1999). With this conceptualisation, harmonic ambidexterity has been beneficial to organisational life. The seminal article of Gibson and Birkinshaw (2004) found a positive relationship with organisational unit performance. Later research observed that business units are capable of simultaneously creating new capabilities and exercising existing competencies that engage a high level of venture strategic performance (Hill & Birkinshaw, 2008).

2.2.5 Balance Ambidexterity vs. Combined Ambidexterity

Two lines of research have assessed and measured the concept of organisational ambidexterity. The first is the notion of trade, which requires a suitable balance between explorative and exploitative activities through its conflicting demands by including resource allocation and the utilisation of different mechanisms to formalise control over organisational resources. This notion is consistent with March's (1991) definition, which views explorative and exploitative behaviours as two ends of a continuum that should be appropriately traded off.

Another line of research that has recently begun to characterise exploitation and exploration as independent organisational activities proposes engagement in high levels of explorative and exploitative functions at the same time (Beckman, 2006; Gupta et al., 2006; Jansen et al., 2006), rather than finding a suitable balance. Therefore, organisational ambidexterity somehow relates to the simultaneous pursuit of both activities, which raises a concern as to whether this conceptualisation should be a 'matched magnitude' of exploration and exploitation on a relative basis, or the 'combined magnitude' of both activities (Cao et al., 2009, pp.1-2). This is emphasised through how the ambidexterity construct needs to be operationalised in a

reliable manner to prevent any ambiguity and misinterpretation, for both academics and practitioners.

By explicitly distinguishing between these two forms of ambidextrous dimension, the ambidexterity concept is principally comprised of two types of dimensions. One, the balance ambidexterity, which is two distinct functions that are related. The balance ambidexterity corresponds to a firm that focusses on sustaining a close relative balance between exploratory and exploitative functions.

Second, the combined ambidexterity pertains to their combined magnitude (Cao et al., 2009). Considering that this thesis examines the context of the new business development project, it is well established that technological and market knowledge differs in terms of timing and competencies at the project level. This stresses the concept of fit, or how a manager can create a fit between the creations of technological and market knowledge through experience and organisational mechanisms (Burgers, Jansen, Van den Bosch, & Volberda, 2009).

NBD projects must be continuously enacted to manage the technological and market changes that are constantly emerging through new opportunities, while structuring the required exploitation using organisational mechanisms in order to mitigate any possible errors and deviations for those opportunities. Therefore, both activities are placed in a complementary domain and use resource allocations (Gupta et al., 2006). Exploitation and exploration are mutually supportive of each other and intertwined. In other words, a high degree of exploitation activities can reinforce a NBD project's capability to explore new knowledge and resources, which are equally supportive factors in new products and markets (Cao et al., 2009). This is because managers must constantly use existing knowledge and resources to support explorations in the project; thus, the regular allocation of resources causes deeper understanding of their functionality where managers are similarly proficient in exploration (Mihalache, Jansen, Van den Bosch, & Volberda, 2014). As a result, the project becomes more proficient in structuring many different configurations of existing knowledge and resources in line with exploration. Simply put, proficiency in exploitation capabilities creates better approaches for exploration processes. Similarly, proficiency in exploration supports more constructive methods of exploitation. Overall, in the setting of NBD projects, both functions are complementary and interdependent, requiring pursuit using the combined

ambidexterity (Cao et al., 2009). To this end, the above evaluation demonstrates the benefit of combined ambidexterity at the project level; therefore, as the current study examines NBD at the project level, the combined ambidexterity is applied, rather than balance ambidexterity.

Academics and practitioners have distinguished between the project levels, particularly the NBD project and other organisational levels, where different levels demand distinctive managerial methods and structures (Hazir, 2015; Tiwana, 2010). Although some organizational levels, such as the unit level, can be similar to the project level, they are technically quite dissimilar in how they are strategically managed (Gregory & Keil, 2014). When different managerial methods are used, the differences between unit and project levels become more obvious, which ultimately helps to prevent misperception. The project and unit levels differ in how the strategic plan is operationalised. At the NBD project level, people are required to act in a very dynamic manner to achieve their goals, and in order to accomplish this; they must shift their functions between different, often random tasks. Conversely, there is far more stability and standardization at the unit level, where individuals are mostly involved with routine and predicable tasks rather than random and uncertain functions. While a unit member may act in non-routine or dynamic way at a particular time; NBD does not allow for individuals to undertake routine functions (Gregory & Keil 2014). Therefore, it has been determined that the combined ambidexterity might be the proper option for creating ambidexterity at the project level.

2.2.6 Ambidexterity Antecedents and Consequences

Harmonic ambidexterity was initially examined in the study of Adler and Borys (1996). The authors did not focus exclusively on the concept, but they did create a general view of how firms can achieve exploitative and explorative activities using different organisational mechanisms. They conceptualised ambidextrous behaviour as efficiency and flexibility structured together within an organisation. They proposed the idea that ambidextrous behaviour is shaped by organic and mechanistic organisational controls by enabling control mechanisms and using a coercive form of controls. In this sense, flexibility is essential to non-routine tasks that require the enabling of control mechanisms; at the same time, routine tasks demand efficient processes with coercive mechanisms. When routine and non-

routine tasks are managed together using both types of control mechanisms, the organisation has an opportunity to become ambidextrous (Adler & Borys, 1996).

Building upon contextual factors, Jansen and colleagues (2006) empirically analysed the role of formal and informal control mechanisms in relation to the exploitative and explorative innovations within organisational units. In this study, competitiveness and dynamism (two fundamental environmental elements) were used as the moderator's factors. The results showed that centralisation as a formal mechanism had no effect on the exploitative innovation; however, formalisation as a formal mechanism had a positive effect on exploitative innovation. Furthermore, connectedness as an informal mechanism had a positive effect on explorative innovation. They noted that, in competitive environments, firms were successful when they mostly focussed on exploitative innovation; in dynamic environments, firms were successful when they mostly focussed on explorative innovation. Indeed, the study makes a great contribution to the concept of organisational ambidexterity by proposing better clarification and understanding of the role of control mechanisms and how organisational units can successfully respond to the multidimensional environmental elements (Jansen et al., 2006).

In this stream of research, Mom and colleagues (2009) investigated the role of formal structural and personal control mechanisms in relation to ambidexterity at individual levels. This was the first seminal study to examine ambidexterity at individual levels by considering contextual factors. They investigated how control mechanisms by interactions effected assisted individuals in becoming ambidextrous, and divided control mechanisms into formal and informal categories. The results indicate that the decentralised decision-making authority, as a structural mechanism, positively affects ambidexterity. This is comprised of more motivations and abilities to become more sensitive about the range of opportunities that have occurred in both internal and external environments. However, formalisation as the formal structural mechanism negatively affects ambidextrous behaviour by imposing restrictions and limitations on individuals. It is important to note that Mom and colleagues (2009) only investigated the formalisation in the coercive form, and the enabling form of formalisation should also be considered (Adler & Borys, 1996; Ahrens & Chapman, 2004; Chapman & Kihn , 2009; Jordan & Messner, 2012; Jorgensen & Messner, 2009).

In regards to informal control mechanisms, both connectedness and cross-functional teams have positive effects on ambidextrous behaviour. Mom et al. (2009) concluded that ambidextrous managers require more generalised skills rather than specialising in a specific business field, and interactions of organisational mechanisms are important in shaping ambidextrous behaviour at individual levels, as it helps individuals to tackle conflicting demands. Accordingly, this line of research has suggested leadership and cultural mechanisms can be supporting factors in the formation of ambidextrous behaviour (Raisch & Birkinshaw, 2008).

In the same line of contextual factors, Beckman (2006) examined ambidextrous behaviour in relation to team compositions through two opposing constructs: common prior company affiliations and diverse prior company affiliations.

Furthermore, he empirically investigated units where members were in the same company for a long period of time and mostly engaged in exploitative functions, because they had a better understanding of the different issues and problems within the company that gave them more acceleration. Conversely, units where members had different experiences in diverse firms and environments naturally tended more toward discovering and exploring new ideas. Beckman mentioned that the diversity of prior affiliations alone could not improve performance, because diversity mostly encourages explorative functions. Similarly, common prior affiliations alone cannot improve performance, as mutual affiliations stimulate exploitative functions, but do not have unique capabilities to explore. As a result, the complementary combination of common and prior company affiliations in the team composition is a significant mechanism in facilitating ambidextrous behaviour within a sub-unit, and team composition is an important antecedent of exploitative and explorative functions and ambidexterity (Beckman, 2006).

In summary, the above explanation demonstrates the consequences and antecedents of harmonic ambidexterity in order to capture a partial picture of the concept. The antecedents of harmonic ambidexterity are generally given different contextual terms, such as *structural and personal control mechanisms* (Mom et al., 2009), *formal and informal control mechanisms* (Jansen et al., 2006, Tiwana, 2010), etc.

However, those conceptualisations are related to the context of the study, which demands a narrower specification in line with the study topic. As this study is

in line with the control perspective, and examines the ambidexterity antecedent by conceptualising control mechanisms, control mechanisms are applied as antecedent to ambidexterity. The following section describes the notion of control with its systematic approach in relation to the concept of ambidexterity and its activities of exploitation and exploration.

2.3 CONTROL SYSTEMS

This section describes the role of the control system, which makes a central contribution to the formation of ambidextrous behaviour. It explains the general notion in relation to the concept of control and then defines the control system using a set of control mechanisms. It also explores how different control mechanisms (formal and informal) can be combined in a synergetic way to produce the positive result of ambidextrous behaviour within NBD projects. Formal and informal mechanisms have distinctive features and characteristics, and fundamentally oppose each other. Thus, the combination of both can develop ambidextrous behaviour. Formal control mechanisms are generally associated with exploitative functions; conversely, informal mechanisms are related to explorative functions. Therefore, the combination of formal and informal control mechanisms in a synergetic way can potentially benefit ambidextrous behaviour. The latter portion of this section states the rationale for why the particular formal and informal control mechanisms were chosen for this thesis and describes their typologies.

2.3.1 Introduction

Control is a business function that managers must inevitably use when the achievement of managerial goals is not entirely assured (Flamholt, 1996). This reflects the simple fact that establishing goals and a designing a strategic plan does not necessarily ensure that a company's strategy can be achieved in the required fashion (Simons, 1995). In a narrow sense, it means that administrating a strategic plan at hierarchical organisational levels does not ensure that employees will follow all instructions in the way that they should (Demski & Sappington, 1989). Thus, control is a key managerial function that can establish an alignment between organisational strategy and employee perceptions in order to generate a mutual benefit (Tessier & Otley, 2012). In the traditional principle of control, a common ideology of control relies on the restriction of individuals who are limited by the

rules and procedures (Chapman, 2005). Although control is naturally required to govern individuals' actions in line with the organisational strategy, it also provides adequate freedom and liberty to allow individuals to accomplish their tasks. Thus, controlling functions are comprised of the tension between liberty and restriction, using formal and informal patterns to shape individual behaviours (Simons, 2000).

2.3.2 Control System Conceptualisation

In order to recognise a general view of control in the organisation, the control system must be defined as a combination of formal and informal patterns that create a synergetic outcome of the organisational mechanism in order to achieve the organisational strategy (Simons, 1995). In this context, Flamholt (1996) outlined the control system as a set of formal and informal mechanisms, which are designed to increase the probability that people will behave in ways that lead to the achievement of the organisational objectives. Alternatively, control systems are also defined as any formal or informal mechanisms that managers use to stimulate employee creativity and to be in line with organisational objectives (Cardinal et al., 2004; Das & Teng, 1998; Simons, 1994). Without knowing the nature of a particular control mechanism, it is impossible to analyse the fundamental steps of the control system and its relationship to the organisational strategy. A valid and holistic understating of the control system requires an analysis of a set of control mechanisms.

2.3.3 Control Mechanisms: Formal and Informal

As mentioned previously, the control system needs to provide an acceptable behaviour that requires integration of diverse formal and informal mechanisms (Chiesa et al., 2010; Jorgensen & Messener, 2009). Formal control mechanisms mostly rely on an efficient version of control to provide an efficient and effective process for exploitative functions; on the other hand, informal mechanisms rely heavily on particular social aspects to improve coordination of new ideas and concepts for explorative functions (Jarzabkowski, Le & Feldman 2012; Tiwana, 2010). Control mechanisms assist employees to resolve the tension between exploitative and explorative functions, in order for the business to become ambidextrous as an outcome of the control system. In this setting, prior research has asserted that formal and informal control mechanisms have different influences on exploratory and exploitative functions (Davila, Foster, & Li, 2009; Ylinen & Gullkvist, 2013); however, empirical studies examining such relationships have had

mixed results (Ylinen & Gullkvist, 2013). Research has emphasised that exploratory and exploitative functions require different formal and informal control mechanisms due to their contradictory and conflicting features (Cardinal, 2001; Jansen et al., 2009; Ylinen & Gullkvist, 2013).

2.3.4 Combination of Controls mechanisms

Organisational scholars have previously investigated only one form of control mechanisms in isolated conditions (Ouchi, 1979), as organisations usually choose only one strategic orientation at a time (Porter, 1985). The accepted perception is that different organisational control mechanisms are relatively linked to different strategies (Chenhall & Morris, 1995). Consequently, research has concentrated on examining only one form of control mechanism that assists in achieving a particular strategy, instead of considering both formal and informal control mechanisms, which could develop diverse strategies (Malmi & Brown, 2008).

However, it was later accepted that formal and informal control mechanisms need to be combined to capture all effects of the control system to successfully achieve diverse strategies (Gregory & Keil, 2014; Tiwana, 2010). Additionally, studies have shifted to an examination of the potential effects of formal control mechanisms at the level of simultaneous support on informal control mechanisms within the control system (Malmi & Brown 2008), and eventually the effects of formal and informal control mechanisms on both aspects of exploratory and exploitative functions (Bisbe & Otley, 2004; Chenhall & Morris, 1995; Gregory & Keil, 2014; Henri, 2006; Jorgensen & Messner, 2009; Mundy, 2010). In this respect, based on empirical and theoretical points of view, scholars have recently largely suggested that formal and informal control mechanisms must be combined in order to manage different aspects of strategies, such as exploitative and explorative functions (Chenhall & Morris, 1995; Gregory & Keil, 2014; Henri, 2006; Lewis, Welsh, Dehler, & Green, 2002).

Thus, formal and informal controls should be combined in order to effectively execute diverse organisational strategies, such as exploitative and explorative functions (Brown & Eisenhardt, 1997; Ahrens & Chapman, 2004; Simons 1990; Ylinen & Gullkvist, 2013). Such a combination requires a logical demonstration of the interrelationship between formal and informal mechanisms that demand systematic procedures (Bedford & Malmi, 2015; Gregory & Keil, 2014;. In this

sense, the combination of formal and informal control mechanisms creates an integrative and synergetic system in order to meet diverse organisational strategies (Meer-Kooistra & Kamminga, 2015; Simons, 2000). Thus, this thesis investigates the combination of formal and informal control mechanisms as a system; the reason behind this combination can be linked back to the successful management of exploitative and explorative functions. This combination provides both exploitative and explorative functions for ambidextrous behaviour (Adler & Chen, 2011, Malmi & Brown, 2008; Mundy, 2010). Thus, the following section describes the benefits of control systems for ambidextrous behaviour in NBD projects.

2.3.5 Control Systems and New Business Development Projects

In the context of a new business development project, it is important to understand how managers select formal and informal control mechanisms as a system to foster the individual to have liberty, while at the same time working within specific boundaries to achieve both exploitative and explorative functions (Chiesa et al., 2010; Gregory & Keil, 2014). The NBD project is comprised of fast product introduction, diverse product functionalities, and shorter life cycles that put more pressure on the project to achieve a superior performance (Akroyd & Maguire, 2011; Davila, 2002). Indeed, NBD projects with high performance levels require a management style that considers creativity and freedom; at the same time, discipline and control are indispensable to exploitative and explorative functions (Akroyd & Maguire, 2011; Davila & Foster, 2005; Gregory & Keil, 2014).

The key challenge is not only the unilateral management of explorative functions through a loose structure, or permissive management style, but also introducing efficiency parameters for the whole project through exploitative functions (Davila, 2000). However, prior control literature has stressed the ineffective control system in the context of NBD projects, as it hinders the creativity of explorative activities (Abernethy & Brownell, 1997; Birnberg, 1988; Brownell, 1985; Rockness & Shields, 1984). This stream of research has only considered the formal mechanism of the control system. It is proposed that the formal mechanism, by applying roles and constraining behaviour, highly reduces the level of explorative behaviour and negatively affects the performance of projects (Damanpour, 1991).

Another stream of literature goes beyond the traditional perspective of the control system; it fills the current gap regarding whether the control system is

beneficial for the innovation of explorative functions, or is limited to the improvement of strict efficiency parameters and enhancement of exploitative functions (Akroyd & Maguire, 2011; Bisbe, 2015; Davila, 2000; Gregory & Keil, 2014; Hazir, 2015; Jorgensen & Messner, 2009). This line of research has considered both formal and informal mechanisms that benefit exploitative and explorative functions. In this context, Gregory and Keil (2014) investigated formal and informal control mechanisms and explained how their different features might affect employee attitudes to not only help them to be more efficient in exploitative functions, but to also be creative in explorative activities at the project level. Furthermore, Tiwana (2010) argued that the combination of formal and informal control mechanisms is essential to achieving ambidexterity at the project level. Through understanding the notion of control systems and their contribution to the formation of ambidextrous behaviour in NBD projects. Another rationale for studying NBD projects is that some scholars and practitioners believe the management of an NBD project relies largely on explorative functions, and an NBD project is seen as an innovative and explorative organisational process, which ultimately helps the organisation to explore new resources and knowledge. As a result of such a belief, many NBD projects have failed due to neglecting the simultaneous utilisation of explorative functions with exploitative functions within an NBD project (Hill and Birkinshaw, 2014). Nevertheless, an NBD project is required to conduct both explorative and exploitative functions rather than substitutional. It is necessary for the project to become ambidextrous, as this helps an NBD project to obtain the capability to achieve its goals in order to explore new resources and knowledge, thereby improving organisational performance (Burgers et al., 2008). The inability to develop ambidextrous behaviours in NBD projects is a major cause of NBD failure (Hill and Birkinshaw, 2014). The proper development of organizational control mechanisms that foster ambidextrous behaviour in new business development is a major gap in the literature (Burgers et al., 2008; Hill and Birkinshaw, 2014). A primary approach for stimulating ambidextrous behaviour at the organisational level is the combination of informal and formal control mechanisms (Burgers et al, 2009; Jansen et al., 2009). It is therefore essential to examine how these concepts apply to stimulating ambidextrous behaviour in NBD-projects. The following section describes the selected control mechanisms in regards to this study and discusses their conceptual domain.

2.3.6 Selected Control Mechanisms

The current study examines four control mechanisms in the investigation of ambidextrous behaviour: centralised decision-making, budget, interactive control, and project manager experience. Centralised decision making and budget were selected as the formal mechanisms, while interactive control and project manager experience were selected as the informal mechanisms. The following section introduces the general definition of the study's concepts. Each concept is explained in more detail in the next chapter through a description of their features, natures, and effects.

2.3.6.1 Centralised Decision-Making

In this respect, decision-making is a vital element of organisational life, and has been considered an important managerial topic in both strategic and control literature (Aiken & Hage, 1971; Jansen et al., 2005). Centralised decision-making is the extent to which the authority to make decisions affecting the organisation is confined to higher levels of the hierarchy (Child, 1974). It is principally accepted that this form of decision-making is fundamental to the success of a project, as it allows employees to make correct judgments by allocating their time and resources between exploitative and explorative functions (Akroyd & Maguire, et al., 2011; Korhonen, Laine, & Martinsuo, 2014). Therefore, this study recognises such a mechanism as an important element in the development of ambidextrous behaviour of NBD projects.

2.3.6.2 Budgeting

Budget is a main and primary mechanism of organisational control (Abernethy & Brownell, 1999). Managers apply budgets regularly as a mechanism to coordinate the employee in a stable way (Merchant, 2007). Budget is defined as a quantitative expression of a plan for a defined period of time (Abernethy & Brownell, 1999). It may include planned sales volumes and revenues, resource quantities, costs and expenses, assets, liabilities, and cash flow. It expresses the strategic plans of a business project in a financial setting. In other words, budgets include project activities or events in measurable terms. In this respect, budget is recognised as a formal control mechanism that provides accountability for performance measurement (Drury, 2000, pp. 605). At the project level, such a mechanism plays a key role in

coordinating project resources and what the project needs to achieve as an output (Davila & Wouters, 2005). Budget is a critical mechanism for the accomplishment of exploitative and explorative functions; it is important to understand its role and implications in NBD projects.

2.3.6.3 Interactive Control

Interactive control is applied to determine clear agendas and frameworks for the organisation. Interactive control provides further interactions and member engagements to achieve project goals (Bonner, Ruekert, & Walker, 2002 et al., 2002; Simons, 1994). The interactive control mechanism consists of more informal channels, such as dialogue, debate, day-to-day managerial attention, and face-to-face meetings, which provides a common practical language (Henri, 2006; Simons, 1994; Widener, 2007). Such a mechanism is used by project managers to regularly and personally involve themselves in the decision-making activities of project members. Interactive control provides project members with a better understanding of project strategies, which empowers them to better understand what they need to achieve and how to manage exploitative and explorative functions (Bisbe & Otley, 2004; Simons, 1995, 2010). Such a capability is highlighted more and more at the project level, where project members require very explicit views about the project's strategy in order to allocate their time and resources for exploitative and explorative functions (Revellino & Mouritsen, 2015; van der Meer-Kooistra & Scapens, 2015). The core of interactive mechanisms centres on dialogue that is key to creativity of explorative functions. In this sense, the interactive control mechanism is defined in this study as an informal control that is an important element within the project.

2.3.6.4 Project Manager Experience

Project manager experience as a leadership role is the central control mechanism to integrate employees. Project managers form the central line of communication to conduct strategy in line with the project's outcome (Gittell, 2010). A main and critical role of the project manager is to coordinate and integrate the business project so that it is successful (Akroyd & Maguire, 2011; H. Chen, 2015). Such control is the main line of communication between top managers and project members in order to manage the project in line with top managers' exceptions (Gemunden et al., 2005). In doing so, project managers play a significant role in the formation of ambidextrous behaviour within the project. They pay close attention to

contradictory activities in order to ensure that the different aspects of project performance are achieved, such as cost, quality, delivery (re: exploitation), creativity, experimentation, and new technology (re: exploration) (Ling, 2004; Akroyd & Maguire, 2011). As a result, effective management of exploitation and exploration activities is largely affected by the project manager's experience of how to disseminate the project strategy among employees (Ling, 2004). In this context, the project manager is defined as an informal control mechanism and a project controller (Akroyd & Maguire, 2011).

As mentioned in the previous section, harmony ambidexterity is a method that organisations undertake using different contextual factors to empower employees to perform ambidextrous behaviours. Contextual factors, such as formal and informal control mechanisms, could promote the context of behavioural direction towards a collective ability to pursue both explorative and exploitative activities, with the employee then capable of performing ambidextrous behaviour using their own judgment. Thus, their judgment is reinforced by the contexts that influence formal and informal control mechanisms; as such, harmonic ambidexterity is seen as the logical choice.

In this view, harmonic ambidexterity may be the proper optional method to select for the development of ambidextrous behaviour at the NBD project level by comparing partitional, cyclical, and reciprocal methods. As these methods mainly rely on matters of place and time rather than impacting context, harmonic ambidexterity was deemed to be the most reasonable option in this study. Overall, it was determined that formal and informal control mechanisms contextually impact on project member's ability to become ambidextrous, as such, this study empirically examines the relationships between control mechanisms and ambidextrous behaviour.

Chapter 3: Hypothesis Development

3.1 INTRODUCTION

This study examines the effect of the combination of formal and informal control mechanisms on ambidextrous behaviour. This section conceptualises the selected control mechanisms with their specifications for further clarity and internal consistency, and explains the effects of the combination of the mechanisms and their relation to the concept of ambidexterity.

As mentioned previously, formal control mechanisms usually reinforce exploitative functions due to their efficient characteristics, whereas informal control mechanisms usually support explorative functions due to their loose and flexible features. In order to develop and maintain ambidextrous behaviour, it is essential to combine these opposing mechanisms. However, it is important to note that ambidextrous behaviour is often shaped through different approaches to organisational mechanisms in diverse contexts and settings. For example, in some studies, the formal control mechanism has a positive effect on explorative functions, such as in research and development settings (Cardinal, 2001); on the other hand, the informal control mechanism has a positive effect on the exploitative functions at the unit level (Jansen, et al., 2006). On this basis, what are the interaction effects of formal and informal control mechanisms on ambidextrous behaviour in new business development projects? The following section begins with an explanation of the combination of formal and informal control mechanisms; then examines the different combinations and their proposed hypotheses.

3.2 COMBINATION OF CONTROL MECHANISMS

Formal and informal control mechanisms need to be combined into a system in order to create a synergetic result (Cardinal et al., 2004). There have been long and enduring discussions as to whether formal and informal control mechanisms can complement or substitute for one another (Cardinal, 2001; Kirsch, 1996; Siggelkow, 2002; Whittington, Pettigrew, Peck, Fenton, & Conyon, 1999). Here, complement refers to the simultaneous application of an informal control mechanism reinforcing the benefits of a formal control mechanism; substitute means that the simultaneous

use of an informal control reduces the benefits of formal control mechanisms (Cardinal et al., 2004; Mundy, 2010). In fact, two things can be complementary if more of one raises benefits for using the other, or they can be substituted if more of one reduces the benefits of using the other (Mundy, 2010).

In this setting, the ambidextrous behaviour in the context of the new business development project needs to be achieved in the complementary domain of exploitative and explorative functions. It was established earlier that NBDs, by nature, demand the pursuit of both activities at the same pace of exercise, referred to as combined ambidexterity (Cao et al., 2009). In other words, both functions need to be enacted in interdependent and complementary ways in order to create a synergetic result. This requires the capacity to simultaneously structure exploitative and explorative functions subject to complementary forms of formal and informal controls to capture all demands of both functions.

Therefore, the interaction of control mechanisms in a project control system is the principal managerial method used to reconcile the contradictory demands of both exploitative and explorative functions (Rustagi, King, & Kirsch, 2008). The combination of informal with formal control mechanisms can simultaneously improve both aspects of ambidexterity (Chiesa et al., 2010; Tiwana, 2010; Ylinen & Gullkvist, 2013). Fundamentally, a project needs to utilise both formal and informal control mechanisms to manage exploitative and explorative functions through to its specific attributes and demands.

In addition, the rationale for why formal control mechanisms need to be combined with informal mechanisms relates principally to their features. As mentioned previously, the formal control mechanisms include distinctive efficient attitudes that mainly support exploitative functions. Conversely, the informal control mechanisms greatly support explorative functions due to their loose and flexible features. Therefore, to create ambidextrous behaviour, it may not be possible to exclusively use one form of control in isolation, such as formal control (Tiwana, 2010). As discussed previously, a formal control mechanism, such as budgeting, mainly reinforces the exploitative function, rarely supporting the explorative function due to its strict and efficient nature. However, at the same time, if such a control mechanism can be combined with an informal control mechanism, such as interactive control—which has a loose and flexible style—the result is the synergistic

decrease of the negative attributes of budgeting in relation to the explorative functions in the development of ambidexterity.

Thus, the following sections explain the combination of formal and informal mechanisms in regards to the mechanisms chosen for this thesis: centralisation, budgeting, interactive control, and project manager experience. First, in regards to the literature, an explanation is provided regarding how the interactive control mechanism can help improve the negative features of centralisation and budgeting in order to provide mutual benefits for both aspects of ambidexterity. Second, the project manager's experience and its implication in budgeting and centralisation is also explained.

Overall, the two sections justify the rationale for the need for such combinations, and how the combination of formal and informal control mechanisms can synergistically collaborate to create ambidexterity according to the literature on strategy and control.

3.3 COMBINATION OF INTERACTIVE CONTROL AND CENTRALISED DECISION-MAKING

A business project can become ambidextrous by simultaneously pursuing exploitative and exploration functions. The ambidextrous project needs to combine two compositional features of formal and informal mechanisms in order to achieve such behaviour (Tiwana, 2010). In this setting, centralisation as a formal mechanism is reflected by locus of authority (Damanpour, 1991), and the extent to which decision-making is concentrated in a project in an attempt to create narrow communication channels and reduce the risk of decision makers in accordance with project objectives (Gemunden et al., 2005). It is noted that centralisation is a main beneficial element in speeding up ambidextrous behaviour due to efficiency in increasing information processes (Cardinal, 2001). On the other hand, it raises the sense of control by hindering the ambidextrous behaviour of individuals to find the new solutions through routine processes (Jansen et al., 2006). As the exploratory functions demand non-routine procedures, centralisation of the decision maker seems to hinder the ambidextrous behaviour.

In fact, ambidexterity increases the members' decision-making authority by stimulating their enthusiasm to become aware and identify a diverse range of market

and technological opportunities (Cardinal, 2001). Expanding member authority helps them become more aware and recognise a larger variety of opportunities and needs by opening up more possibilities for exploration and the recognition of diverse ideas and information across the project (Birkinshaw & Gibson, 2004; Jaworski & Kohli, 1993).

Thus, centralisation cannot exclusively positively affect the development of ambidextrous behaviour. Even though it has a beneficial role in exploitative functions, without informal control features, it may not provide any benefits to explorative activities, and subsequently to ambidextrous behaviour (Tiwana, 2010). Therefore, for the new business development project to be ambidextrous, formal and informal control mechanisms need to be applied simultaneously in order to support both functions (Tiwana, 2010). On one hand, centralisation is used for the exploitative function; on the other hand, the informal mechanism can reduce its negative effect on innovation and searching for exploitative functions. It is here that the use of interactive controls as the informal mechanism can synergistically reduce some of the negative effects of centralisation (Bedford & Malmi, 2015). For instance, increasing interactive controls enhances members' ability to better comprehend the identified diverse needs and opportunities through face-to-face communication and the exchange of knowledge (Bedford, 2015; Henri, 2006). Interactive controls provide a common base of understanding within interactive and collaborative conflict resolution, in line with centralised decision-making (Simons, 2000). This understanding can be improved by closely connected networks reducing ambiguity surrounding different needs and opportunities by engaging in frequent, reciprocal, and non-routine information processing (Mom et al., 2009).

Finally, as indicated, increasingly centralised decision-making may have negative consequences on ambidexterity as a whole (Cardinal, 2001; Jansen et al., 2006). Increasing interactive control with centralisation can reduce those negative consequences by providing more openness to different opportunities and knowledge sharing through face-to-face debate (Bedford & Malmi, 2015). Thus, it is assumed that the combination of centralisation as a formal control and interactive control as an informal mechanism can create benefits for both functions of ambidexterity in NBD projects. These arguments suggest the following hypothesis:

Hypothesis 1: Interactive control positively moderates the effect of centralised decision-making on ambidextrous behaviour in NBD projects.

3.4 COMBINATION OF INTERACTIVE CONTROL AND BUDGETING

As previously mentioned, budgeting contains some restrictive features that hinder explorative functions. The budgetary targets and their defined responsibilities have been seen as a mechanism to limit the scope of empowered managers to flexibly operate, reinforcing ambidextrous behaviour (Frow & Marginson, 2010).

Integrating budgets as a formal control mechanism with different forms of informal control mechanisms, such as the interactive form, encourages managers to make decisions in operational matters when confronted with uncertainty and also enables them to revise the plan and reallocate resources in order to meet strategic goals through changes, empowering them to impose strict accountability to ensure exploitation (Abernethy & Brownell, 1999; Chenhall, 2008; Chenhall, Kallunki, & Silvola, 2011).

A number of recent studies have therefore focused on how budgeting, with its restrictive features, can be applied in loose and flexible ways that provide an organisation with the capability to exploit current resources and explore future opportunities (Abernethy & Brownell, 1999). In this particular line of research, scholars have suggested the simultaneous application of budgets and an interactive control mechanism (Abernethy & Brownell, 1999; Frow & Marginson, 2010).

The simultaneous application of the budget and the interactive control mechanism involves further participation from project members and managers to conduct ambidextrous behaviour. In this way, an ongoing dialogue has been shaped between project members and managers to discuss many aspects of budgeting, such as designing the initial plan, variances that occur over implementation, determining whether those variances are in line with project goals, changing and improving the budgeting process through more interaction, and discussion in response to those variances (Frow & Marginson, 2010).

Aberenthy and Brownell (1999) suggested the combination of interactive control mechanisms and budgeting that helps with both exploitative and explorative functions. They noted that budgeting is the main mechanism that coordinates resources in line with organisational strategies, however, such a mechanism can

hinder flexibility and creativity in market and product development, negatively impacting explorative functions. As a result, managers use budgeting mechanisms with the interactive control mechanism to help conduct both exploitative and explorative functions. This helps the budget become less restrictive and more flexible (Berenthy & Brownell, 1999).

Despite the fact that many studies have theoretically and empirically accepted that the combination of interactive and budgeting functions could benefit exploitative and explorative functions (Bedford & Malmi, 2015; Berenthy & Brownell, 1999; Davila & Wouters, 2005; Frow & Marginson, 2010), there is very little empirical knowledge in relation to the concept of ambidexterity (Sivabalan & Bisbe, 2015). Therefore, it is important for any future research to consider the combination of interactive control mechanisms and budgeting in relation to the development of ambidextrous behaviour. Thus, leading to the following hypothesis:

Hypothesis 2: Interactive control positively moderates the effect of budgeting on ambidextrous behaviour in NBD projects.

3.5 PROJECT MANAGER EXPERIENCE AND CENTRALISED DECISION-MAKING

As stated earlier, centralisation is an efficient form of control that is an essential mechanism in preventing conflict and ambiguity in NBD (Harmancioglu, McNally, Calantone, & Durmusoglu, 2007). Even though it helps to support ambidextrous behaviour by providing supervision for project uncertainties, it also may reduce team autonomy and motivation and discourage new ideas and product development for explorative functions (J. Chen, Neubaum, Reilly, & Lynn, 2015). There is a dichotomy to the use of centralisation. On one hand, it is an essential control mechanism for the implementation of the project phase; on the other hand, it is not beneficial to ambidextrous behaviour in different phases of the project, such as development (Cardinal, 2001). Effective NBD projects find a balance between centralised decision-making and flexibility for explorative functions. For example, centralised decision making can be achieved by setting milestones and a time line, and flexibility can be achieved by involving project managers to assist members with better controlled decision making about uncertain factors at their milestones (Thieme, Song, & Shin, 2003). Project managers can help members in diverse situations to decrease the level of centralised decision making while staying in line

with project objectives. Naturally, members are continuously involved in various project functions; they require freedom and autonomy to make decisions. However, it is important that their decisions are in line with project objectives (Jorgensen & Messner, 2009). They often neglect the main objective of the project and act exclusively toward achieving their task without a vision of where the project goals are as a whole. Thus, centralised decision making helps to ensure that their decisions are closer to the project objectives (Harmancioglu et al., 2007); at the same time, the project manager can provide more freedom and flexibility for their decisions where this is required for exploration of their tasks through experimentation, testing new ideas, and contributing to new knowledge (Jorgensen & Messner, 2009). These arguments suggest the following hypothesis.

Hypothesis 3: Project manager experience positively moderates the effect of centralised decision-making on ambidextrous behaviour in NBD projects.

3.6 PROJECT MANAGER EXPERIENCE AND BUDGETING

Budgeting is defined as an efficient feature of formal control (Merchant, 1981). Budgeting is a central role in the business project; it is initially designed as the first control mechanism before starting a project. Budgeting in its own nature has a set of efficient features that often hinder explorative functions. Furthermore, budgeting has dysfunctional consequences when it is strongly used to evaluate managerial performance for rewards and compensation, suggesting a more flexible style of budgeting (Otley, 1978). A more flexible style of budgeting should largely be used with personally oriented informal control, such as manager's engagement (Merchant, 1981). In a narrower context, when the budget is designed, it is implemented in the project as a formal mechanism with the expectation that the budget target is the central goal that should be met whether there are variations in the market that affect the budget target or not; thus, it is efficient and very strict. Project managers can affect the efficiency of this feature through their own personal experience and skills by looking to market changes and realistically revising budgeting goals over different project phases. Additionally, both the theoretical and empirical results propose that budgets do not provide a similar understanding of budgeting targets for each person; dealing with project budgets requires the manager to have tacit knowledge, and knowledge of different functional divisions (Bryer, 2014; Davila & Wouters, 2005; Kihn, 2011). Therefore, the role of project manager is critical to reaching a common

understanding of the budget for each member, which similarly helps to reduce its efficient features. These arguments suggest the following hypothesis.

Hypothesis 4: Project manager experience positively moderates the effect of budgeting on ambidextrous behaviour in NBD projects.

3.7 RESEARCH MODEL

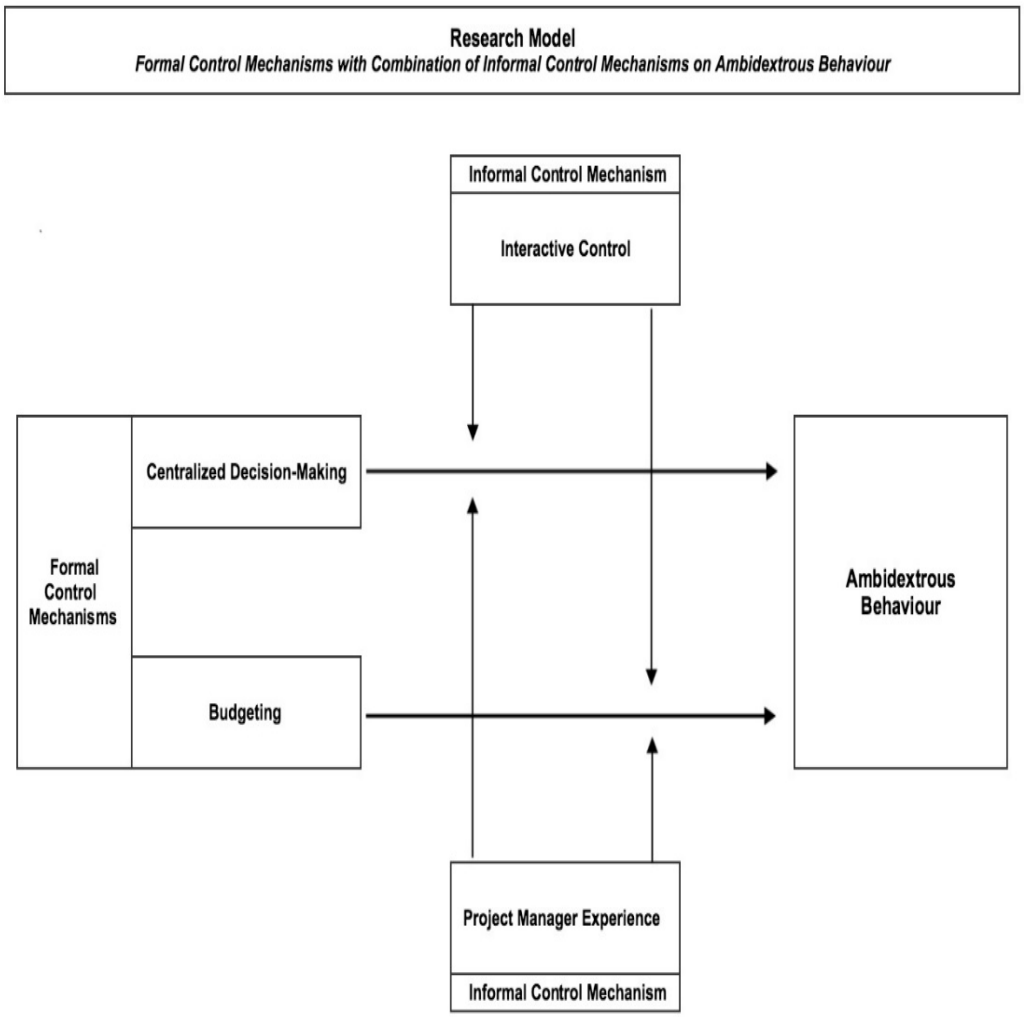

Figure 3.1 Research Model

Chapter 4: Research Methodology

4.1 RESEARCH METHODS

Academic research can be defined as "a systematic quest for knowledge" (Ponterotto, 2005). Research requires meeting some fundamental principles that reflect the reality beyond the researcher's judgment; those principles express the ontological, which is concerned with the researcher's view of the nature of reality; the epistemological, which is concerned with the way that reality is known; and finally, the methodological approach, which includes a particular range of standard processes, procedures, and practices for anticipating the consequences of the reality (Krauss, 2005). Primarily, distinctive research paradigms consistent with specific philosophical views clarify the context of a study (Ponterotto, 2005). In this sense, the common classification of research paradigms is integrated into four schemas: positivism, post-positivism, constructivism or interpretivism, and critical theory (Guba & Lincoln, 1994). Positivists have a general belief that the universe, with its phenomena, is subject to a single objective, with the possibility of measurements and observations of those phenomenon through reality. In this sense, knowledge is required to divide the phenomenon into distinct sections or parts for the direct observation and measurement of those parts and their interrelationships (Krauss, 2005; Ponterotto, 2005). However, due to some fundamental disadvantages and disagreements among scholars, post positivism was established with the view that objective external reality cannot possibly be captured by measurements. The first purpose of such research is to provide an understanding of reality, whilst not having comprehensive recognition (Ponterotto, 2005). Furthermore, post positivists see science as a constant history; they stress the perspective of "theory falsification" versus "theory verification" (Ponterotto, 2005). On the other hand, constructivists or interpretivists argue that the universe is comprised of multiple reasonably known and equally valid realities. They emphasise that reality is highly reflective of the time and specific context. Reality is comprised of diverse thoughts and perceptions of researchers that can generate knowledge; these occur within social and historical contexts.

With the above consideration, the current study focuses on a positivist standpoint. It is essentially based on a view that suggests understanding a phenomenon by testing causal relationships between the taken independent and dependent variables (Godfrey & Hill, 1995; Priem & Butler, 2001). In addition, this study is positivistic due to the use of translating an idea from role theory into a set of testable hypotheses on the effects of the application of the control mechanisms and ambidextrous behaviour (Langfield-Smith, 1997; Hoskisson et al, 1999). The cause and effect-relationship is of major interest to positivists (Priem & Butler, 2001). Therefore, the study selected proposed constructs in relation to potential research gaps and variables to understand their relationship. Constructs show subjects that are not directly observable; however, researchers can misinterpret data when measuring these constructs. A theoretical framework was used to enhance the probability of obtaining factual results, with the study dividing the phenomena into the context for examination.

4.2 RESEARCH SETTING

The study was conducted by obtaining samples of NBDs from the database of the Association of Business Development, Netherlands. The database contained 1074 persons involved in business development activities. An initial examination of the database led to the elimination of 33 persons who were not directly involved in NBD, reducing the sample to 1041 potential respondents. The data was collected in 2007. Companies are highly relevant to the research design, as companies' success relies greatly on new business projects, and the nature of any new business project is to add new knowledge and competencies to the existing knowledge and competencies while improving them as a whole to achieve a synergetic outcome. Considering the theoretical view, it has also been well established that the procedures of the new business projects assist companies to explore and discover new forms of knowledge; hence, building new products and services, while at the same time, pushing the project to act along and within the organisational boundaries (Andriopoulos & Lewis, 2009; Burgers et al., 2008).

4.3 SAMPLE AND DATA COLLECTION

The study collected quantitative data though a survey to test the strength of the relationship between the variables in the research model. The survey instrument was

framed by existing scales, which were validated within the relevant literature. The survey was developed via an exploratory case study of many NBDs within an organisation. All questions were discussed with vice presidents, several directors, and project managers responsible for new technological market developments to ensure their relevance. Surveys were sent to the 1041 potential respondents in the sample; 88 surveys were returned unopened due to change of address. A further 35 surveys were returned by participants who were placed in the sample by mistake. As a result, the effective sample size was 918 participants, of whom 139 returned completed surveys, with a response rate of 15.1 percent. This rate is compatible with prior studies in the same field as the current study (Jansen et al, 2009; Henri & Covin, 2014). Survey data was chosen, as secondary data doesn't commonly provide sufficient information related to a firms' capabilities, such as ambidextrous behaviours as part of a whole system. Other approaches such as experimentation, observation, and case studies can be less suitable, as they are quite time consuming, and also require more financial input. Furthermore, non-direct observation of variables can create incompetent estimation of the stretch between relationships, causing researchers to make statistical generalisations. The survey instrument was developed through testing and revised according to feedback from panels of academic practitioners and consultants.

4.4 MEASURES

The study measured the constructs based on the existing validation scale in the literature, at the same time using multi-item measures for the main constructs, which can add more validity and reliability to the survey instruments (Aloysius, Davis, Wilson, Taylor, & Kottemann, 2003). A seven-point Likert scale was applied to measure the items, which were related to ambidexterity, interactive control, centralisation, project manager, and budget. Most scales were measured using a semantic deferential scale, the same as the original developed by Jansen and colleagues (2006), which is discussed in the following section. Further details about the measurement scales and their role in the current study are described below. As the control mechanisms were comprehensively defined and conceptualised as independent variables in Chapter 3: Hypothesis Development, the following sections provide the typology and concept definition of dependent variables as exploitation and exploration concepts for the operationalisation of the ambidexterity concept.

Section 4.4.5 contains a table that includes all of the survey items, as well as the independent and dependent variables with their operationalisation references.

4.4.1 Combined Ambidexterity

Two constructs, exploitative and exploration, were applied in order to operationalise the combined ambidexterity in new business development projects. The exploitative and exploration scales was originally developed by Jansen and colleagues (2006) to capture the extent to which units depart from existing knowledge and pursue innovation for emerging customers and the market. To measure the exploitative functions, the extent to which units build upon existing knowledge and meet the needs of existing customers is captured; the explorative functions describes the extent to which units build upon new knowledge and meet the need for new customers and service (Jansen et al., 2006). The existing study applied the concept of ambidexterity through conceptualisation of combined ambidexterity, which was also adopted in the study by Cao et al (2009). This conceptualisation suggests that high levels of exploration and exploitation can complement and enhance the effects of the other. The study multiplies exploration and exploitation to operationalise the combined ambidexterity.

4.4.2 Centralised Decision-Making

Centralised decision-making was measured using a centralisation scale adopted from Thornhill and Amit (2001). The concept describes the reporting level of hierarchical accountability of the member in the development implementation stages of the project. This consideration was reflected by Child (1974), who defined ‘centralisation’ as the extent to which the authority to make decisions affecting the organisation is confined to report to higher levels of the hierarchy (Hage & Aiken, 1968). The data was collected in two stages of the project: development and implementation. The implementation stage was examined following the development stage, meaning centralisation was only gauged in the implementation phase of the project. In addition, the items were recoded into four new categorisations; from a high hierarchical reporting level to a low hierarchical reporting level, based on the construct of conceptualisation. As previously mentioned, this thesis defined the centralised decision-making construct based on the reporting hierarchical level. These were then reversed so that ‘independent of the enterprise’ was the most

centralised, and ‘independent business unit’ was the least centralised. After reversing the data, the items were recoded with a different score, as below:

The original scale included the following items: In the new situation, the project was: independent of the enterprise (Score 1), part of a new business group (Score 2), part of R&D (Score 3), part of marketing/sales (Score 4), an independent department/product (Score 5), an independent business unit (Score 6), otherwise, namely (Score 7).

Independent of enterprise, which is less centralised with the most authority, was given a score of one. This project is very decentralised because the enterprise does not report to any companies or CEO.

Part of the new business group was selected as the second score, meaning the NBD project has less autonomy from the enterprise. As it is a team structure, there are certainly more boundaries for members; additionally, the project is likely to report to a unit comparable to marketing or research and development (R&D).

Those items labelled as “otherwise, namely” were recoded in order to fit the other categories. These were coded independently by the researcher and supervisor and the differences were discussed until mutual agreement was reached. For example, there were several suggestions that the project was part of a unit or operated on a very low level in regards to the respondents. This is similar to being part of R&D or marketing/sales in terms of centralised decision-making. These responses were therefore also scored with a 2.

Part of R&D and part of marketing were selected as the third score. The two items were merged into one item in order for the information to be considered together, as the structures are the same in many organisations. On one hand, these items are more centralised than the team and independent people; on the other hand, they are more decentralised than department and unit.

An independent department/product and an independent business unit were selected as the fourth score, and as it may not have been possible to distinguish between them, further observations were demanded. Therefore, merging them was the best possible option in this case.

The below items form the new hierarchy of categories for the centralised decision making construct, and a higher number indicates a higher level of centralisation:

1. Independent of enterprise
2. Part of a department
3. Independent department
4. Independent business unit

4.4.3 Budgeting

The concept of budget has been applied using general and common interpretations. It is defined as a quantitative expression of a plan for a defined period of time (Abernethy & Brownell, 1999). Budgeting is conceptualised as a quantitative expression of a plan for a defined period of time using a reporting approach.

The budgeting construct was adapted to the two stages of the NBD project: the development stage, and the implementation stage. The implementation stage was considered after the development stage; meaning budgeting was gauged only in the implementation phase, and then recoded to a different score as follows:

The original scale included the following items: In the new situation, the budget for the project was part of: The annual budget cycle (Score 1), the marketing/sales budget (Score 2), R&D budget (Score 3), a fund for new business development (Score 4), otherwise, namely (Score 5)

A fund for new business development was selected as the score of one, as it is the most decentralised for reporting to a higher level. The nature of the project is usually to deliver the final output and product to the organisation or the customer; thus, it is likely that the project reports to a higher level regarding how the budget is being used during its process. By nature, NBD projects have a tendency to escape close scrutiny by top management, and are willing to deliver the product and service with the lowest price, on time, without any strict reporting. In this respect, the score of one was deemed the most suitable.

Part of R&D and part of marketing were selected as the score of two. These items were merged into one item as they are the same in many organisations. On one hand, these items are more centralised than team and project; on the other hand, they

are more decentralised than department and unit. Thus, the score of two was deemed the most suitable.

Similar to the centralisation question, those items labelled “otherwise, namely” were recoded by reaching agreement between two raters (the researcher and supervisor). In regards to the respondents, they answered using terms such as ‘external funding’, ‘under indirect cost’, and ‘flexible budget with no specific plan’; therefore, those items can be located between the department and the annual budget, and the score of three was the most appropriate.

The annual budget was selected as the score of four, as it is more centralised in terms of reporting the budget progression to higher levels. The annual budget is often comprised of strict reporting and monitoring processes; thus, this item was selected as the score of four, with the highest level of budgeting report.

The below list specifies the new categorisations of the budgeting construct; a higher number represents a higher level of budget reporting.

1. Specifically for the project
2. Part of a department
3. Independent department
4. The annual budget

4.4.4 Interactive Control

Interactive control was measured based on the interactive scale developed by Simons (1994) and Bonner and colleagues (2002). The interactive control construct is conceptualised using two natures of analysis and measurement through two sub-constructs: *team operational control* and *team strategic control.* The former concerns the project’s goal, deadline, and budget, and the latter is relative to the project’s strategy to move constructively towards its organisational goals and objectives.

4.4.5 Project Manager Experience

Project manager experience was measured using a project manager experience scale adapted from Blindenbach & Ende (2006). The concept is defined as leaders who are capable of interpreting the market; understanding the different languages of the departments; dealing with engineering issues; and communicating effectively

inside the team, as well as outside, “while guarding the concept and resolving conflicts” (Blindenbach & Ende, 2006).

Table 4.1 describes the operationalisation of the study concept and its items.

Table 4.1 The operationalisation of the study concept

Survey Items	Cronbach alpha	FA Loading
Exploitation (Jansen et al., 2006)	0.692	
1) The emphasis on cost reduction		0.354
2) Increases the efficiency of production and services		0.835
3) Improved the developed products or services		0.814
4) The emphasis on increasing economies of scale of products or services developed		0.714
Exploration (Jansen et al., 2006)	0.557	
1) New products or services developed alongside already developed products or services		0.583
2) Exploited new opportunities that lay beyond the initial scope of the project		0.539
3) Additional sales channels developed		0.837
4) New customers searched and accessed in markets that were beyond the initial scope of the project		0.829
Interactive (Simon, 1994; Bonner, Ruekert, & Walker, 2002 et al., 2002)	0.928	
1) Definition of the objectives of the project		0.885
2) Specifying deadlines		0.862
3) Selecting the project members		0.848
4) Determining the budget for the project		0.829
5) Determining the strategy of the project		0.824
6) Determining a target market		0.804
7) Determining the sales and profit targets		0.802
Project Manager Experience (Blindenbach & Ende, 2006)	0.778	
1) Had a lot of authority		0.717
2) Had great knowledge of the target market		0.659
3) Was viewed by the organisation as a senior manager		0.834
4) Had the necessary technical skills		0.568
5) Had a lot of experience as a project manager		0.628
6) Had a lot of experience building new businesses		0.723
Centralisation (Thornhill & Amit, 2001)		
During implementation of the project, the project manager reported directly to:		
1) Independent of enterprise		
2) Part of a department		
3) Independent department		
4) Independent business unit		
Budget		
During implementation, the budget for the project is:		
1) Specifically for the project		
2) Part of a department		
3) An independent department		
4) Part of the annual budget		

Ambidexterity (Cao et al., 2009) **1)** Combined Ambidexterity (exploitation *exploration)	0.520	

4.5 MEASUREMENT AND VALIDATION OF CONSTRUCTS

Fundamentally, the scale measurement must be reliable and valid to accurately capture the construct in the correct manner. In this view, it is argued that social sciences researchers mainly deal with latent variables that are not directly observable (DeVellis, 2003). As a result, when measuring latent constructs, it is essential to define a diverse set of items representing the particular constructs. After all, there is a need for researchers to assess the reliability and validity of the scale. Reliability refers to the extent to which the measures provide consistent results. Reliability can be measured by assessing the internal consistency among the items representing a construct (DeVellis, 2003). The most predominant measure of internal consistency criteria is Cronbach's coefficient alpha (Cronbach, 1951). The alpha reveals the proportion of total variation among a set of items due to true variation in the latent variable (DeVellis, 2003). Generally, Cronbach's coefficient alpha should ideally be above 0.7; however, it is quite sensitive to the numbers of items in a scale; with a short scale (fewer than 10 items), it is common to find quite low values (Hair, Black, Babin, Anderson, & Tatham, 2006). Therefore, a value of 0.60 is acceptable for a scale with less than 10 items (Mooi & Sarstedt, 2011). In this research, 0.60 was chosen as the cut-off for the evaluation, and all constructs returned a fairly high coefficient alpha, greater than 0.60, as follows: exploitation (0.692), interactive (0.928), and project manager (0.782), with the exception of exploration (0.557). Four items measured the exploration scale; however, centralised decision-making and budgeting were measured by one item in the validated scale, which did not provide a coefficient alpha. As Cronbach's coefficient alpha is influenced by a number of items (Schmitt, 1996), a value is not a significant threat to reliability (Mooi & Sarstedt, 2011).

In fact, reliability is an essential component for any research, but alone is not sufficient to ensure the quality of a measurement scale. A measurement must be valid, that is, the extent to which a scale measures what it is supposed to measure (Dane, 1990). Various types of validity have been discussed among scholars; content validity is the suggestive way to assess the scale (DeVellis, 2003). Content validity can be described as the extent to which a set of items reflects the content domain of a

variable (DeVellis, 2003). This study applied different methods to verify the survey instrument's content validity. In this process, the literature was extensively reviewed and considered to reach a comprehensive understanding of the constructs and their conceptual domain. The items were derived from validated scales published in high quality journals. Mostly constructs were comprised of multi-dimensional measurement scales to ensure content validity. Additionally, practitioner and consultant feedback was incorporated to revise and improve the possible options in the scales.

Convergent and discriminant validity are two common and well-known methods that scholars have primarily suggested for survey instruments. This means the survey must be followed by construct validity, which can be defined as "determining the extent to which a measure represents concepts it should represent and does not represent concepts it should not represent" (Dane, 1990, p. 259). The convergent validity reflects the extent to which measures of one concept are correlated, and discriminant validity concerns the extent to which measures of a concept do not correlate with the measures of different concepts (Hair et al., 2006). Therefore, the current study conducted exploratory factor analysis to empirically assess the convergent validity (Bagozzi, Yi, & Phillips, 1991). Accordingly, the conducted exploratory factor analysis was applied for investigation of the statistical power of factor loadings using Statistical Package of Social Science version 22.0 (Ruppert & Matteson, 2015). This method can evaluate and develop scales by exploring the interrelationships among a set of variables within a construct (Pallant, 2010). There are some commonly available extraction techniques in this method, and the current study applied the principal components method, as this is the most common method for this type of analysis. However, it is up to the researcher to select the number of factors that they consider best describe the underlying relationships among existing variables (Pallant, 2010). This occurs by balancing two conflicting needs in the research design: the need to find the simplest solution with the fewest possible factors; and the need to describe as much of the variance in the original dataset as possible (Pallant, 2010). In this view, Tabachnick and Fidell (2007) suggested experimentation with a different number of factors until a satisfactory solution is found. As a result, and considering the techniques that can assist with decision-making regarding the process in exploratory factor analysis, the following

criteria were considered to prove whether the construct was appropriate or not: KMO-Bartlett, and factor loadings. The below section explains each cut-off in regards to the constructs used in this study.

4.5.1 KMO-Bartlett

For verification of the data's suitability for factor analysis, the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy was first checked. In fact, the final decision of whether the data are appropriate for principal components analysis should be primarily based on the KMO statistic, and a KMO above 0.5 can be accepted (Mooi & Sarstedt, 2011). In relation to Bartlett's Test of Sphericity, the sig. value can be 0.05 or smaller (Pallant, 2010). The KMO/sig results for this study are as follows: exploration construct (0.566 - σ: 0), exploitation (0.644 - σ: 0), interactive control (0.902 - σ: 0), and project manager experience (0.774 - σ: 0). As shown, all KMO constructs are above 0.5 and the sig results are smaller than 0.05. Centralisation and budgeting do not have a factor score, as they were only measured by one item.

4.5.2 Factor Loading

Factor loading provides information about "how much of the variance in each item is explained; low values (less than 0.3) could indicate that the item doesn't fit well with the other items in its component" (Pallant, 2010 pp.198). In this case, communality commonly needs to measure at more than 0.5, requiring researchers to have a sufficient explanation; however, less than 0.5 with high loading factors can provide more opportunity to retain those variables (Hair et al. 1998). Similarly, with communalities around 0.50, sample sizes between 100 and 200 are sufficient (Mooi & Sarstedt, 2011). Within this setting, all constructs, including exploration, exploitation, interactive control, and project experience, carried the above 0.5, with the exception of one variable in exploitation scale, which was 0.354, this variable was removed in the exploitation scale for the construct validity (Bagozzi et al., 1991).

Chapter 5: Results

5.1 DESCRIPTIVE STATISTICS AND CORRELATION

Table 5.1 presents an overview of the means, standard deviations, and correlations of the main variables. In order to examine multicollinearity, this study calculated variance inflation factors (VIF) for each of the regression equations. The maximum VIF within the models was 1.165, which is acceptable below the rule-of-thumb cut-off of 10 (Dawson & Richter, 2006).

Table 5.1: Means, standard deviations, and correlations

Variables		Mean	SD	Correlation				
				1	2	3	4	5
1	**Ambidexterity**	8.55	2.31	(-1)				
2	**Centralisation**	5.04	3.19	0.14*	(-1)			
3	**Budget**	4.55	1.38	0.03	0.23**	(-1)		
4	**Interactive Control**	4.27	1.69	0.13*	0.18**	0.15*	(-1)	
5	**Project Manager**	5.13	1.01	0.04	0.1*	-0.07	0.13*	(-1)

**. Correlation is significant at the .01 level (2-tailed). * Correlation is significant at the .05 level (2-tailed).

a N = 139. Numbers in parentheses on the diagonal are Cronbach alphas of the composite scales.

Table 5.2 reports the VIF, which quantifies the severity of multicollinearity. VIF provides an index that measures how much the variance (the square of the

estimate's standard deviation) of an estimated regression coefficient is increased due to collinearity.

Table 5.2: Multicollinearity

Model		Collinearity Statistics	
		Tolerance	VIF
2	(Constant)		
	Centralisation	.884	1.131
	Budget	.846	1.182
	Interactive Control	.918	1.089
	Project Manager	.963	1.038
	Interactive Control*Budget	.860	1.162
	Interactive Control*Centralisation	.876	1.142
	Project Manager*Budget	.859	1.165
	Project Manager*Centralisation	.893	1.119

a. Dependent Variable: Ambidexterity Combined Dimension

Table 5.3: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	22.615	4	5.654	1.062	.378[b]
	Residual	707.939	133	5.323		
	Total	730.555	137			
2	Regression	79.071	8	9.884	1.957	.057[c]
	Residual	651.483	129	5.050		
	Total	730.555	137			

a. Dependent Variable: Ambidexterity Combined Dimension

b. Predictors: (Constant), project manager, budget, interactive control, centralisation

c. Predictors: (Constant), project manager, budget, interactive control, centralisation, project manager*centralisation, interactive control*budget, interactive control*centralisation, project manager*budget

5.2 REGRESSION ANALYSIS

A linear regression analysis was conducted to explain the effects of formal and informal control mechanisms upon the development of ambidextrous behaviour in new business development projects (Dawson& Richter, 2006). Two regression models were built within the framework. Model 1 is the ordinary least squares regression and Model 2 is the bootstrap regression.

In addition, bootstrapping is presently the most commonly suggested method for testing moderate and conditional process models (Dawson & Richter, 2006). The bootstrap is a reasonably new method of empirically assessing characteristics of population distributions from sample data (Russell & Dean, 2000). Bootstrapping seeks to uncover more information about the properties of estimators for "unknown" populations and ill-behaved parameters. Bootstrapping is a method for deriving robust estimates of standard errors and confidence intervals for estimates, such as the mean, moderate, proportion, correlation coefficient, or regression coefficient (Dawson & Richter, 2006). The bootstrap method is recommended for small sample sizes, as it can provide operators with more confidence. As such, considering the study's sample data, a bootstrap method was conducted with 5000 bootstrap samples in order to evaluate the significance of the moderate effect.

In order to interpret the regression results, the Beta in standardised coefficients was considered to evaluate which dependent variable was more important. Consideration of the Beta value allowed recognition of which variables made the strongest unique contribution to the explanation of the dependent variable (Pallant, 2010). Additionally, by undertaking standardised coefficients, interpretations were based on the standard deviations of the variables. Each coefficient indicates the number of standard deviations that the predicted response changes for one standard deviation change in a predictor, all other predictors remaining constant (Dawson& Richter, 2006). For example, one standard deviation change in centralisation yields an increase in ambidexterity of 0.125 standard deviations.

Table 5.4: Results of Regression Analyses for an Ambidexterity

	Model 1: Ambidexterity	Model 2: Ambidexterity	P-Value	*Confidence Interval BCa 95%*	
Main Effect				**Lower**	**Upper**
Centralization	0.091	0.082	0.191	-0.057	0.22
Budget	-0.022	-0.066	0.658	-0.364	0.205
Interactive	0.140	0.097	0.416	-0.146	0.345
Project Manager	0.033	0.046	0.828	-0.342	0.474
Interaction effects					
Interactive*Centralization		0.058	0.054	-0.001	0.123
Interactive*Budget		0.118	0.134	0.024	0.275
Project Manager*Centralization		-0.170	0.021	-0.319	-0.058
Project Manager*Budget		0.284	0.046	0.017	0.608
R-Square	0.031	0.108			
Adjusted R-Square	0.002	0.053			
F improvement of fit	1.062	2.795			

Notes:
a. Bootstrap results are based on 5000 bootstrap samples
b. Dependent Variable: Ambidexterity Combined
c. N = 139 unstandardised coefficients are reported, with standard errors in parentheses, as well as standardised coefficients.
d. Reports standardized regression coefficients

Model 1 includes the main effects (centralised decision-making, budgeting, interactive control, and project manager experience), which were regressed on ambidexterity (Table 5.1). Model 2, includes interaction effects (moderate effects) (interactive control*budgeting, interactive control*centralised decision-making, project manager experience*budgeting, project manager experience*centralised decision-making), in addition to main effects (centralised decision-making, budgeting, interactive control, and project manager experience), which were

regressed on ambidexterity (Table 5.1). In the context of Model 2, Hypotheses 1-4 were tested.

5.3 INTERPRETING INTERACTION EFFECTS

The procedures proposed by Aiken and West (1991), Dawson (2014), and Dawson and Richter (2006) (see: http://www.jeremydawson.co.uk/slopes.htm) were used to plot the interaction effects. The following two-way interactions were considered: interactive control*budget, interactive control*centralisation, project manager experience*budget, project manager experience*centralisation.

Hypothesis 1

In respect to Hypothesis 1, which predicted that interactive control would have a positive moderate effect on centralised decision-making in the development of ambidextrous behaviour in NBD projects, the interaction term between centralised decision-making and interactive control was positive but significant (b=0.058, p= 0.054). The bootstrap analysis (Table 5.4) reflects a 95% confidence interval for the centralised decision-making*interactive control slope coefficient (-0.001; 0.123). It can also be seen that a 95% confidence interval includes 0. Thus, the centralised decision-making*interactive control slope coefficient is not different from 0 at the 5% significance level.

Considering the result, it is possibly inappropriate to interpret P-value, as the possibility that null hypothesis H0 is false. Thus, suggesting that P-value is the probability that the sample value become at the minimum the value essentially could be observed if the null hypothesis is true (Bettis, Ethiraj, Gambardella, Helfat, & Mitchell, 2016). To this end, it would be inappropriate to conclude that there is no effect based on the confidence interval and the P-value, which is very close to .05. Therefore, Model 2 could support Hypothesis 1. Furthermore, the plot of the interaction is shown in Figure 5.1, demonstrating a more positive relationship between centralised decision-making and ambidexterity when interactive control is high, and a less positive relationship when interactive control is low. This supports the hypothesis that interactive control can synergistically impact on centralised decision-making in order to benefit ambidextrous behaviour.

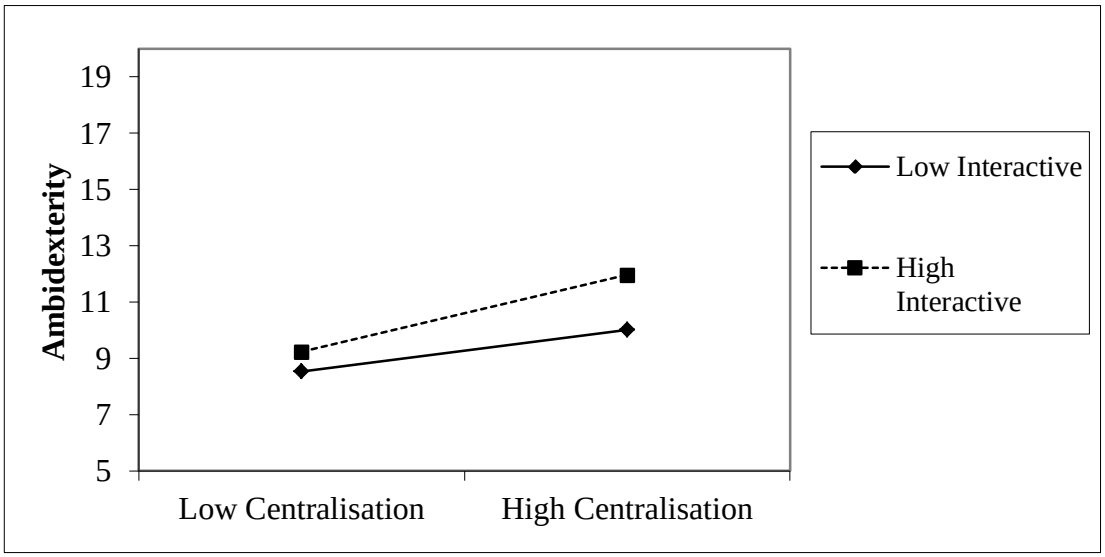

Figure 5.1: Two-way interaction plot of centralisation and interactive control

Hypothesis 2

With regards to Hypothesis 2, the results reflect that interactive control would positively moderate the relationship between ambidexterity and budget (b=0.118, p=0.134). The bootstrap analysis (Table 5.4) reflects a 95% confidence interval for the budget*interactive control slope coefficient (0.024; 0.275). It can also be seen that a 95% confidence interval does not include 0. Hence, the budget*interactive control slope coefficient is different from 0 at the 5% significance level. An interactive control reinforces the budgeting in building ambidextrous behaviour, thereby confirming Hypothesis 2, which predicted that interactive control would have a moderate positive effect on budgeting in the development of ambidextrous behaviour in NBD projects. The plot of the interaction is shown in Figure 5.2, demonstrating that the relationship between budgeting and ambidexterity is positive. It shows a more positive relationship between budgeting and ambidexterity when interactive control is high, and a less positive relationship when interactive control is low. This supports the hypothesis that interactive control can synergistically impact on budgeting in order to create the benefit for ambidextrous behaviour.

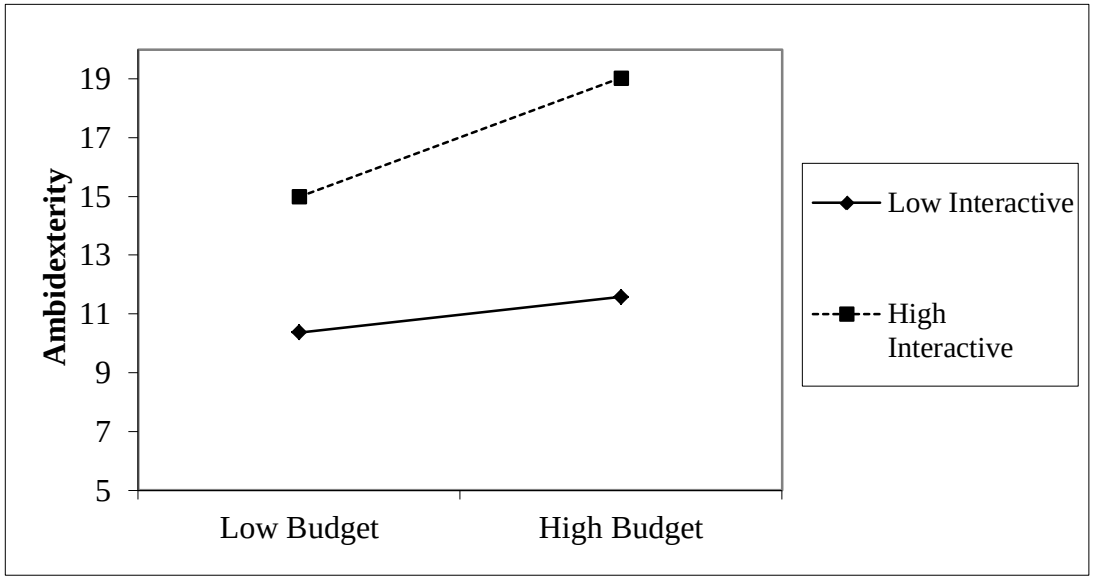

Figure 5.2: Two-way interaction plot of budget and interactive control

Hypothesis 3

With respect to Hypothesis 3, which predicted that project manager experience would have a moderate positive effect on the centralised decision-making in relation to ambidextrous behaviour in NBD projects, the result did not support the hypothesis (b=-0.170, p=0.021). The interaction term between a centralised decision-making and project manager experience was negative and significant. The bootstrap analysis (Table 5.4) reflects a 95% confidence interval for the centralisation*project manager experience slope coefficient (-0.319; -0.058). It shows that a 95% confidence interval doesn't include 0. Hence, the centralised decision-making*project manager experience slope coefficient is different from 0 at the 5% significance level. As a result, Model 2 does not support Hypothesis 3. The plot of the interaction is shown in Figure 5.3, demonstrating that the relationship between centralised decision-making and ambidexterity is more negative when project manager experience is high, and more positive when project manager experience is low.

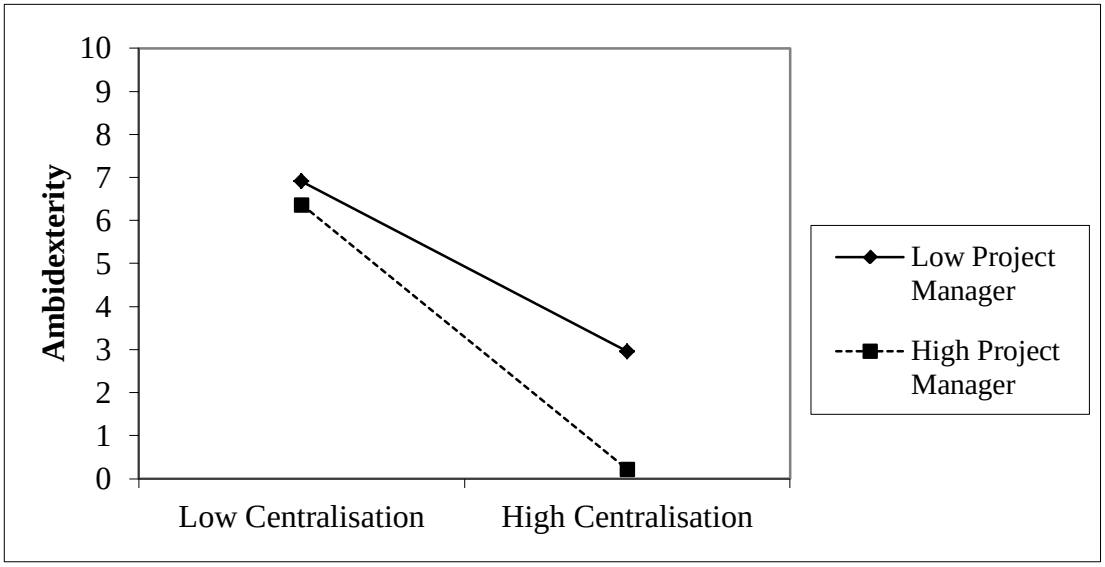

Figure 5.3: Two-way interaction plot of centralisation and project manager experience

Hypothesis 4

In relation to Hypothesis 4, a project manager significantly strengthens budgeting in relation to the development of ambidexterity (b= 0.284, p=0.046). The bootstrap analysis (Table 5.4) reflects a 95% confidence interval for budget*project manager experience slope coefficient (0.017; 0.608). It shows that a 95% confidence interval includes 0. Thus, the budget*project manager experience slope coefficient is not different from 0 at the 5% significance level, thereby confirming Hypothesis 4, which predicted that project manager experience would have a moderate positive effect on budgeting in the development of ambidextrous behaviour in an NBD project. Figure. 5.4 shows that in relation to the ambidextrous behaviour, a project manager is a tool to attain synergy between budgeting and ambidexterity. It shows a more positive relationship between budgeting and ambidexterity when project manager experience records are high, and a less positive relationship when project manager experience records are low.

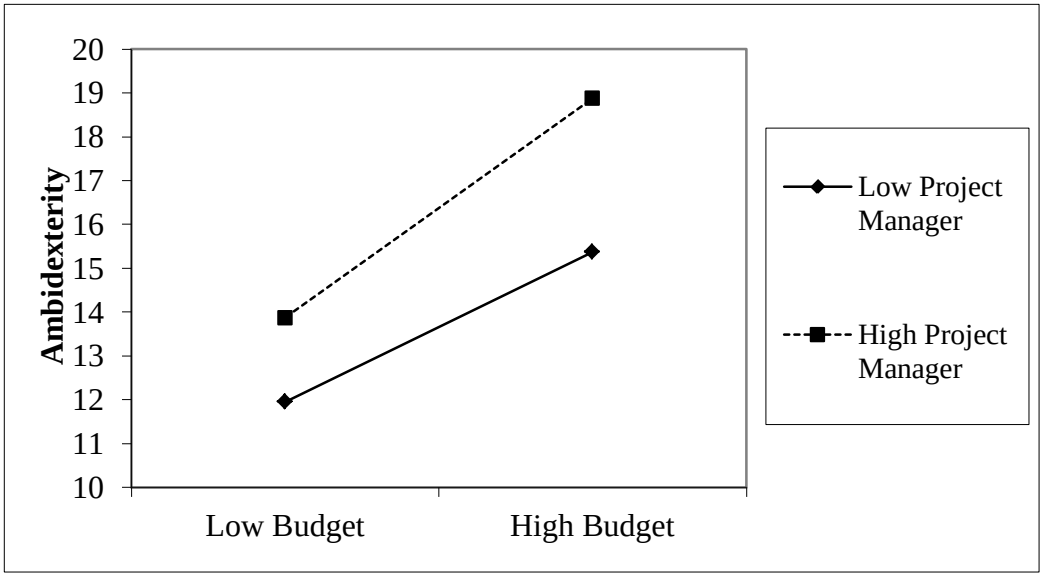

Figure 5.4 Two-way interaction plot of budget and project manager experience

Chapter 6: Discussion and Conclusions

6.1 DISCUSSIONS

The objective of this study was to explore the role of formal and informal mechanisms within the control system with regards to the development of ambidextrous behaviour in new business development (NBD) projects.

The main contribution of this study is the exploration of the role of control mechanisms in managing the competing theoretical standpoints on whether formal and informal control mechanisms are complements or substitutions for one another in relation to the development of ambidextrous behaviour at project levels.

Despite the fact that prior research has examined the relationship between formal and informal control mechanisms with ambidextrous behaviour, and that one line of research has supported a complementary role of formal and informal control mechanisms, thus far, little empirical knowledge has shown whether such a method is consistent with a project structure where the patterns of control may be entirely dissimilar (Korhonen et al. 2014). This thesis tested this core idea by exploring how a complementary view rather than a substitute view of formal and informal control mechanisms can contribute to the establishment of ambidextrous behaviour in NBD projects.

The findings show the larger benefits of creating complements between formal and informal control mechanisms for the development of ambidextrous behaviour in new business development projects. This means that within the NBD project control system, formal and informal mechanisms need to be synergistically complemented in order to build ambidextrous behaviour. This finding is consistent with prior literature that emphasised complementary methods of control mechanisms (Chenhall & Moers, 2015; Sivabalan & Bisbe, 2015; Tiwana, 2010).

Hypotheses 1 to 4 proposed that the interactions between formal controls and informal controls were the key contribution to the development of ambidextrous behaviour at the project level. Hypotheses 1, 2, and 4 confirmed the benefits of such an interaction when an informal control mechanism moderately affects a formal mechanism in order to reinforce the contradictory functions of ambidexterity;

namely, exploitation and exploration. In this regard, Hypotheses 2 and 4 demonstrated that interactive control and project manager experience have a synergetic role with the budgeting process in the formation of ambidexterity behaviour. This is consistent with prior studies contending that budgets should be combined with informal mechanisms in order to gain a benefit when using ambidexterity behaviour (Abernethy& Brownell, 1999; Davila & Wouters, 2005). Furthermore, Hypothesis 1 showed that centralised decision-making can be beneficial in the formation of ambidextrous behaviour when it is combined with interactive control within a project. However, such a combination with project manager experience decreases ambidexterity at the project level, which the results of Hypothesis 3 demonstrate.

Taken in the light of ambidexterity and its harmonic formation; which is grounded in the literature on organisational contexts, cultural values, social norms, and informal competencies; this thesis argued that harmonic ambidexterity is the most proper possible type of ambidextrous behaviour in the setting of NBD projects. In the context of NBD projects, the project is undertaken to generate unique products and services within a limited budget and time period; in addition, the NBD project is forced to tackle technological and market changes. Therefore, it is necessary for NBD projects to simultaneously pursue exploitative and explorative functions for generating ambidextrous behaviour, enabling them to also grapple with technological and market changes, and produce timely, unique products and services. To do so, project members are required to be capable of making integrative judgments regarding how to best allocate their capabilities between exploitative and explorative functions. Such a capability could be promoted by a behavioural orientation in which exploitative and exploration functions simultaneously flourish in a project. In this sense, only the contextual mechanisms can assist such an approach in NBD projects. Appropriately, the findings of the study confirm the success of harmony ambidexterity in NBD projects. In this respect, project manager experience and interactive control acting as informal or contextual mechanisms have a moderate effect on project budgeting, which provides constructive stimulation to prompt the behaviours necessary for harmonic ambidexterity. In addition, centralised decision-making is moderately affected by interactive control, which helps project members dynamically interact in a centralised form of decision-making. Such interactions

provide for the sharing of more skills and knowledge for project members to simultaneously pursue exploitative and explorative functions at the same pace, meaning that exploitative and explorative functions are intertwined and mutually supportive in NBD projects. This thesis contributes to the organisational ambidexterity literature by providing evidence to support the hypothesis that contextual ambidexterity is practically possible in NBD projects. In other words, explorative and exploitative functions, if managed properly, can be complementary activities and mutually supportive of each other. As a result, such a consideration also demonstrates the benefit of combined ambidexterity at the project level. This study implies that harmony ambidexterity with the formation of combined ambidexterity is the most constructive way to develop ambidextrous behaviour in NBD projects. The results offer new insights into the effects of control systems and complementary effects among the formal and informal control mechanisms used to build harmonic ambidextrous behaviour in NBD projects.

In general, the analysis of interaction effects has received significant attention, with the issue of the general difficulty of detecting significant interaction effects where such effects are likely to be common. There have been numerous assumptions as to why this is the case. Jaccard et al. (1995) offered a collection of factors that could contribute to Type II errors in interaction analysis, including unreliability of measures, small sample sizes, or use of ordinal measures. One possible explanation for why the current study does not include very strong results may be related to the low reliability of the study's measures. This would be less likely to cause a significant effect, which would cause an underestimation of the results (Mooi & Sarstedt, 2011).

This thesis examined three research questions: What are the relevant formal and informal control mechanisms required to develop ambidextrous behaviour in new business development projects? Which type of ambidextrous behaviour is most relevant in the context of new business development projects? What are the interaction effects of formal and informal control mechanisms on ambidextrous behaviour in new business development projects? In this sense, the study first theoretically indicates that formal and informal control mechanisms can benefit NBD projects, and introduce the relevant control mechanisms, which can help in development of ambidextrous behaviour in NBD projects. Second, the study is

theoretically grounded by the belief that harmonic ambidexterity is a best possible method for use in an NBD project in order to develop ambidextrous behaviour by conducting the appropriate contextual factors which are formal and informal control mechanisms. Third, the finding clarifies what types of interactions between formal and informal control mechanism create benefits to the formation of ambidexterity in new business development projects.

6.2 THEORETICAL IMPLICATION

A theoretical implication considers the idea that the complementary interrelationship of formal and informal control mechanisms is necessary to successfully develop ambidextrous behaviour (Tiwana, 2010). This idea is derived from the contradictory features that exist between two activities of ambidextrous behaviour, namely exploitation and exploration. The exploitative function requires formal control mechanisms and the explorative function requires informal control mechanisms. The findings from the study challenged this notion by demonstrating that the complementary implementation of formal and informal control mechanisms has relative benefits in developing ambidextrous behaviour. These findings contribute to the strategic and control literature and the existing gap around whether formal and informal control mechanisms should be complementary or substitutional. More importantly, the study sheds new light on the mechanisms that allow contextual ambidexterity to take place in NBD projects.

This thesis examined whether interactive control is appropriately intertwined with budgeting processes, as such a complementary interaction generates a benefit for ambidextrous behaviour in NBD projects. Interactive control as a principal of informal control, part of any current successful business, must be combined with formal control in order to develop ambidextrous behaviour at the project level. This thesis contributes to the literature regarding the positive effects of interactive control on ambidexterity (Bedford, 2015; Kraus et al., 2016), by demonstrating that this effect is further positively strengthened by budgetary control.

Moreover, centralised decision-making, which includes some restrictions on the formation of ambidextrous behaviour, can be beneficial when combined with interactive control within a project. Given the complex behaviours of ambidexterity involving the complementarities of exploration and exploitation, this thesis found

that the positive effect of centralised decision-making on ambidexterity is only successful in combination with interactive control. This contributes to the literature regarding the negative effects of centralised decision-making on ambidexterity (Jansen et al., 2006), by demonstrating that this effect is positively strengthened by interactive control.

In addition, the result suggests that the implementation of a project budget, along with the influence of an experienced project manager, also increases ambidextrous behaviour within a project. The results show a positive interaction effect of project manager experience and budgetary control on the ambidextrous behaviour of NBD projects. However, the interaction effect of centralised decision-making and project manager experience decreases the development of ambidexterity. The implication for future studies is to further investigate the role of this and other moderators when trying to understand the effects project manager experience has on outcomes and behaviours in NBD projects. This contributes to the literature regarding the positive effects of project manager experience on project level outcomes. Prior studies have demonstrated the positive effects on project performance (Yng Ling, 2004; Korhonen et al. 2014; Bisbe & Malagueno, 2015), and this study extends this by demonstrating that it may also have an effect on ambidextrous behaviour.

In this sense, the findings contribute to the literature on organisational ambidexterity, which considers the understanding of organisational mechanisms on ambidextrous behaviour. The study gains a greater understanding of the different organisational mechanisms in relation to ambidextrous behaviour in NBD projects. This effort responds to Simsek et al.'s (2009) call for research to understand the antecedents and outcomes of contextual ambidexterity.

6.3 MANAGERIAL IMPLICATIONS

This thesis has important managerial implications. The findings emphasise the important role of complementary implementation of control mechanisms in enhancing ambidextrous project behaviour. Such a role stresses the interrelationship of mechanisms within a control system that need to be combined in the proper way in order to create synergetic results, such as ambidextrous behaviour. It also shows that a project manager can recognise how the distinctive forms of control mechanisms

that are already in use, or which they aim to use, can have the most benefit for ambidexterity, by combining those controls with their respective complementary control mechanisms. It is important to consider that combining control mechanisms may not be easy in practice within the same system, and evidence from prior studies also shows that practitioners often find it difficult to combine opposing mechanisms in order to succeed with diverse strategies such as exploitative and explorative functions (Ylinen & Gullkvist, 2013).

The results of this study show that budgeting can provide a benefit for ambidextrous behaviour in NBD projects when combined with interactive control and project manager experience. Interactive control, through its moderate effect on the budgeting, comes from face to face dialogue and debate within a project. This finding demonstrates that the project manager could consistently encourage project members to dialogue and debate about budgeting, and appropriately influence the budgeting process using their own attributes, experience, and specialist skills. Such an approach can help the budgeting process to overcome the demands of both exploitative and explorative functions within NBD projects. As a result, top managers aiming to increase ambidexterity in NBD projects should appoint experienced project managers and interactively control them via the budget. In relation to centralised decision-making, such a formal mechanism could be employed in a project where it is combined with interactive control. Interactive control can act as an integrative liaison to reduce the barrier of centralised decision-making. This means that face-to-face dialogue, debate, and cooperation, along with centralised decision-making, benefit ambidexterity. This creates greater possibilities for the project manager to control the project more openly to pursue both exploitative and explorative functions.

6.4 LIMITATION AND FUTURE RESEARCH DIRECTION

This thesis focused on two related themes: the use of control systems and the systematic impact of formal and informal control mechanisms on ambidextrous behaviour. Although this study makes a principal contribution, there are several limitations that should be considered and addressed in future research.

First, the study covers a specific population of cross-functional teams from Dutch NBD projects. To the extent that NBD projects in other regions might

evidence dissimilar attributes and styles in the use of control mechanisms that could be somewhat different, caution is required in generalising the results. Therefore, understanding the role of control mechanisms on other regions and project settings is important. How control mechanisms influence ambidextrous behaviour could look quite different depending upon the culture of a project that is located in a specific county. In this setting, future work should use a cross sectional design to understand the comparative differences between the use of different control mechanisms in diverse national cultures (Guenther, 2013).

Second, although this thesis provides new insights into the control system and its consequences for ambidextrous behaviour, it does not address how project managers are triggered to use particular control mechanisms within a project. It would be beneficial to conduct in-depth studies to better understand how a project manager can influence the use of a particular control mechanism and its influence within the project.

Third, future studies could attempt to investigate a diverse set of control mechanisms at the project level in order to understand adaptive control mechanisms and their impact on ambidextrous behaviour (Davila et al., 2009). Therefore, it is essential to understand the dynamic nature of control mechanisms at the project level through application of a longitudinal design. A longitudinal research design could provide insight into how the functioning of particular control mechanisms changes as a project progresses through the different stages of project development in its life cycle. It is theoretically possible that some types of control mechanism are more widely used in the earlier stages of a project and others in later stages (Tiwana, 2010).

Fourth, prior studies have proposed that ambidexterity is a critical capability for success (Cao et al., 2009; Gibson & Birkinshaw, 2004). Further research is required to explore whether environmental dynamism and competitiveness are important factors in the development of ambidexterity at the project level; this would be an important extension of the current study.

Fifth, this study used combined ambidextrous behaviour at the project level, where exploration and exploitation are complementary and interdependent. Yet, others have questioned whether both higher levels of exploration and exploitation are always desirable and whether we should instead determine the right balance between

exploration and exploitation (Cao et al., 2009). Future research could investigate the role of balanced ambidextrous behaviour in NBD projects. For example, Burgers et al. (2008) suggested that the level of exploration and exploitation depends on the technological and market newness of projects. In this line of reasoning, it would be interesting to investigate how the mix of formal and informal controls as per this thesis can be adjusted in such a way to facilitate an optimal balance of exploration and exploitation for NBD-projects.

Finally, although this thesis provides new insights into how control mechanisms contribute to achieving ambidextrous projects, it does not address the performance implications of achieving an ambidextrous project.

6.5 CONCLUSION

Ambidextrous behaviour is central to organisational success and performance (Cao et al., 2009; Raisch et al., 2009). The investigated relationship between formal and informal control mechanisms in the development of ambidextrous behaviour created significant new insights into the management of new business development projects. Through analysis at the project level, this thesis examined a contingency factor that considerably enriched understanding of the interrelationship between control mechanisms and their complementary roles that assist in the development of ambidextrous behaviour. This study demonstrated that the moderate effect of informal mechanisms on formal mechanisms is assistive. This provides important new avenues for both future research and the administration of new business development projects. The insights that this thesis has delivered could assist new projects to develop ambidextrous behaviour to achieve superior performance.

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